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ORIGINAL ARTICLES

VERTICAL OVERBITE OR ARRESTED VERTICAL DEVELOPMENT IN MOLAR AND PREMOLAR REGION*

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IN the preparation of this paper I have confined myself strictly to my own experiences, covering a period of many years, supplemented by such cases of others as have happened to come under my personal observation.

No authorities have been consulted and none quoted, and while many of the thoughts and opinions herein expressed may appear to some untenable, nevertheless, they will eventually, I believe, be generally accepted as definite truths. No claims for originality are made. Because of the opportunity afforded, I shall take the liberty to occasionally digress from the subject matter to express some of my views.

It is not the desire to minimize the value of the study of biology and correlated sciences in the efforts to fathom the many problems confronting the orthodontist. That would be a grievous error, for without a knowledge of such sciences we could expect to make little progress. I do wish, however, to emphasize this fact, that not until the experiences of all or almost all of those successful practitioners of orthodontia of long experience have been systematically compiled for reference, can any noteworthy progress be made by research workers, and for any person, despite extensive knowledge of philosophy and biology, to dare to offer seemingly plausible theories as facts without many years of successful practical experience in the treatment of malocclusion of the teeth to his credit and ready reference to such compilations (and this does not mean just that which may be found in our published literature of today or yesterday), is most presumptuous.

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In the course of this paper, it will be noted that I have used the Angle classification. My reason for so doing is that it is simple and I, like many others, believe that until more definite knowledge is acquired relative to etiologic factors on which to construct a more suitable one, all other suggestions or substitutions only serve to "befuddle" the issue. Stated rules and measurements as aids in diagnosing have little or no place in the practice of the man who has a true conception of orthodontia. We must liken orthodontia to the arts of painting and sculpturing. The true orthodontist, like the true painter or sculptor, is not made to order. Furthermore, the writer with full knowledge of recent offerings has the temerity to predict that the above classification will continue to remain the basis of any evolved of practical efficiency.

The study of vertical development, coupled with the mobility of the mandible, changes in the angle and neck of the condyle and relation of condyle head to glenoid fossa, is most interesting and gives one an insight into possible causative factors not obtainable in any other way. But as the study of the subject is more or less still in embryo, no attempt will be made at this time to offer anything definite as to the etiologic factors other than to state that the outstanding feature is lack of external stimuli during the period of the eruption, retention and discarding of the deciduous teeth. Further, the writer believes malnutrition and constitutional diseases of children have no direct bearing in the development of these types of malocclusions except in very few instances and show their influence only wherein they may inhibit the desire for foods and their proper mastication with the consequential loss of sufficient external stimulation to proper vertical growth.

I appreciate the fact that much valued research work relative to diet and nutrition and their influence upon the teeth has been done by very eminent men, nevertheless, the attributing of many malocclusions of the teeth to malnutrition as a cause is in my belief an error. The term malnutrition is entirely too broad in its scope to be used indiscriminately as a factor in producing malocclusion of the teeth. We should be more specific. Young children frequently suffer from malnutrition who have plenty of good nourishing food, are "good chewers" and have well-developed arches and sufficient or normal vertical development. On the other hand, there are many others who show no indications of suffering from malnutrition who partake very sparingly of food and side step all such that requires much force in masticating. With them the proper mastication of food is an unknown quantity and they invariably present a condition of arrested vertical development in the molar and premolar region, frequently in the extreme. With many of such when asked to bite hard upon a substance in the process of fitting molar bands there is a seeming lack of ability to display much force. These children are often consumers of large quantities of milk.

We must not allow ourselves to be led away from the old idea that the alveolus is a separate and distinct tissue from that of the maxilla and mandible proper, for it must be so considered orthodontically if we are to be successful in the treatment of our cases notwithstanding its structural similarity. Its presence and quantity are entirely dependent upon the teeth

and their proper use. It will develop about a tooth no matter what its position may be and is not influenced directly by systemic disturbances in its development, but is quite susceptible in its state of development to any undue pressure brought upon it. In fact, it is an organ in itself, has a certain function to perform, and when that has been finally accomplished its presence is no further needed, therefore, nature disposes of it. I will use the terms maxillary dental arch and mandibular dental arch to designate the arches composed of the teeth and alveolar process as separate from that of the maxilla and mandible proper.

Arrested vertical development, unlike that of excessive vertical development (the latter condition not being discussed here), appears at first to be confined entirely to the mandibular dental arch. Upon close examination, however, it will be found to exist in the maxillary dental arch, but to a much lesser degree. Why the condition exists in the mandibular arch to a much greater degree than in the maxillary dental arch, I am not at this time prepared to state. There are cases, however, wherein the condition appears about equal in both arches, but I do not recall ever seeing but one case where it existed to a greater degree in the maxillary dental arch, bone cell disturbance undoubtedly entered as a factor in that particular case. A lack of understanding of this phase of malocclusion has resulted in many errors in diagnosis.

It is a singular fact that in the development of the dental apparatus the mandibular incisors are invariably normal in their vertical arrangement excepting where crowding prevents their full eruption or possible pronounced pathologic conditions about their roots in the permanent denture as pyorrhea alveolaris or kindred diseases which cause them to take positions of supra-occlusion. They are intended as a guide or fixed point by nature, in her process of vertical development in molar and premolar region. This vertical arrangement in the determination of the vertical overbite when given support by developing teeth distal to themselves, helps to counteract any lingual tendency of the maxillary incisors that might occur from force exerted by the lips. When forced by mechanical appliances to positions of infra-occlusion they will invariably return (after being released) to their typical vertical arrangement. Therefore, in an arrest of vertical development in molar and premolar region, not only the lingual surfaces of the maxillary incisors, but the entire premaxillary region of the maxilla becomes, as it were, a great incline plane which may result in a tipping of the mandibular incisors lingually, arresting the anterior development of the mandibular dental arch anterior to first molar; or forcing the mandible to a position distal to normal; or forcing the mandible to a position unilaterally distal to normal; or forcing the maxillary incisors to a position labial to normal, and this impact of the mandibular incisors may frequently involve the premaxillary bones, nasal septum and closely related tissues. A combination of any or all of the foregoing conditions may exist depending upon the degree of arrested vertical development and the functioning of the lips.

Many so-called abnormal frenum cases are nothing more or less than a separation of the maxillary incisors, caused by the occluding of the mandib-

ular incisors high up on their lingual incline surfaces with the frenum dropping into the space. I am doubtful of the existence of an abnormal frenum as a causative factor in malocclusion of the teeth.

At birth, the developing deciduous teeth have a decided lingual inclination as have also the developing permanent ones that follow. In the process of normal development through external stimuli, the teeth not only take on greater vertical arrangement but assume a more upright thence buccal position, and through this process a widening of the dental arches takes place, to a greater degree in the maxilla than in the mandible. A failure in vertical development therefore will result in the dental arches not attaining their full breadth, the degree of which, however, is not always in ratio to the amount of arrested vertical development. It is but natural under such circumstances that there should be an arrest in the lateral development of the maxillary dental arch aggravated through changed muscular tissues.

It has been the writer's experience in his observations of the development of the dental apparatus of young children both deciduous and permanent, that frequently malocclusion of the type belonging to Class II and their subdivisions occur, as it were, overnight or between visits, the matter of only a few weeks intervening. A case today to all appearances developing normally to the uninitiated, may appear tomorrow a full-fledged case of malocclusion of a division or subdivision of Class II, the functioning of the lips being the dominating or controlling factor as to whether the case shall be of Division 1 or 2.

In Division 1, the mandibular incisors are usually well supported lingually and have little or no lingual inclination. The lips are quite flaccid, particularly the upper, thus the labial support is lost. In Division 2, the mandibular incisors are usually lacking in lingual support and are more often than not lingually inclined with one or both sides of mandibular arch foreshortened anterior to first molars. The foreshortening of the arch coupled with the arrested vertical development permits the lower lip to engage the labial surfaces of the maxillary incisors, hence their lingual inclination.

There are conditions where there is a supra-occlusion of the maxillary central incisors, but in such cases it will be found to be due to the occluding impact exerted by mandibular incisors which have good lingual support and a semiflaccid upper lip, both the lips exerting pressure in such a manner as to force them into supra-occlusion.

There now appears to be some intimate relation of vertical development to the impaction of third molars, and if this is the case, it will explain the reason for the disturbances to corrected cases that appear about the time of their eruption.

For the moment, we shall divide the subject of arrested vertical development into four divisions: *First:* and the greatest, that which is due to lack of external stimuli, premature loss of deciduous teeth frequently enter as a contributing factor. *Second:* that which is due to mutilation or absence of teeth and those of possible bone cell disturbance. *Third:* that which may possibly be due to arrest in lateral development of the dental arches. *Fourth:* that which is prenatal in its origin.

In the first division, we shall have cases belonging to Class I, Division 1, Class II, with subdivisions; and Division 2, Class II, with subdivisions. Cases of Class I coming in the first division are of two distinct types as illustrated in Fig. 1.

In the case on the right, we have protruding upper incisors—on the left, a retruding of both upper and lower incisors. In the former, there is an arrest in the horizontal development of the lower dental arch anterior to the first permanent molars: In the latter, the horizontal development in both dental arches anterior to the first permanent molars is arrested, with a pronounced undeveloped appearance about the nose and mouth. In that type as represented by the protruding upper incisors, we will also have arrested vertical development in molar and premolar region in the extreme as shown on the right in Fig. 2.

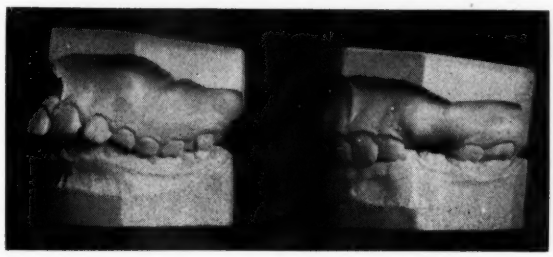


Fig. 1.

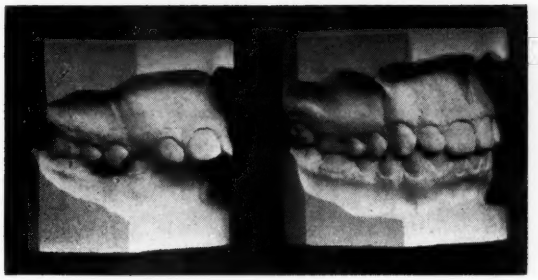


Fig. 2.

Premature loss of deciduous molars is a contributing factor here. Some extent of the arrested vertical development in this case and the vertical development obtained through the treatment may be gleaned from the x-ray pictures, Fig. 3, right, before, left, after, and Fig. 4, right, before, left, after. I appreciate the fact that accuracy in the duplicating of x-ray pictures is practically impossible; however, upon close examination it will be noted that these are as nearly so as it is possible to obtain.

In the cast on the left of Fig. 5 is seen the case as it appeared three years after all appliances were removed. Maxillary second molar is in buccal occlusion which erupted after treatment was completed and will be adjusted later. In Figs. 6 and 7 are shown the portraits of the case.

Contrary to the generally accepted theory that malocclusion of this latter type and of Division 1, Class II, is the result of mouth breathing (which in itself is due to nasopharyngeal obstructions), the writer has found

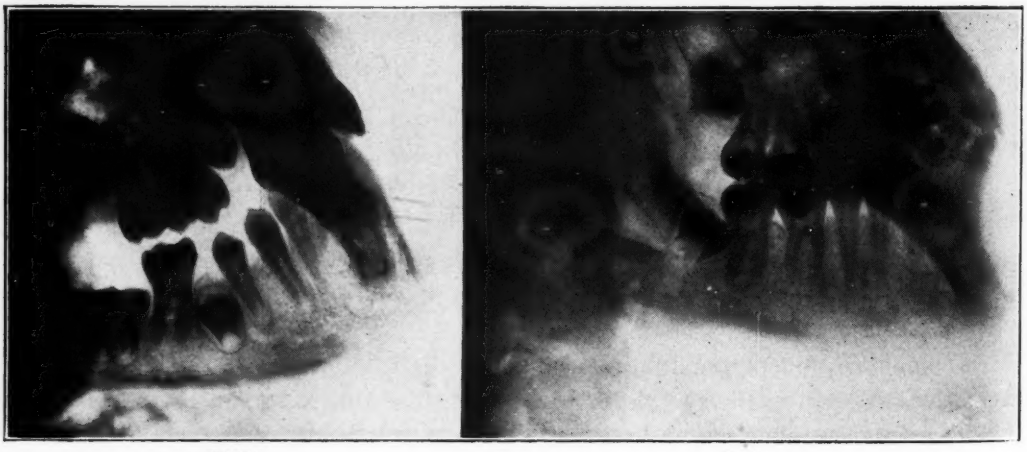
that very few of the cases coming under such classifications are possibly the results of such causes. If this generally accepted theory were a fact, there would be fewer successful treatments by far than is now the case.

If mouth breathing exists in these cases of extreme arrested vertical development in molar and premolar region, it is a result and not a cause. There are many people who are mouth breathers yet who do not possess mal-



Right Left

Fig. 3.



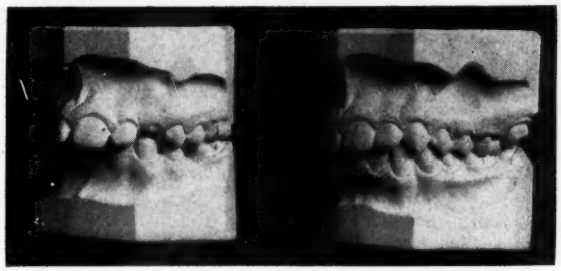
Right Left

Fig. 4.

occlusion to any marked degree, and while mouth breathing will cause an arrest in the lateral development of the maxillary dental arch followed by a retrusion of the mandible, it does not necessarily follow that it must be accompanied by an arrest of vertical development in molar and premolar region with lower incisors occluding with the gingival tissues lingual to the upper incisors. The fact is that, in the greater percentage of malocclusions caused by mouth breathing, arrested vertical development in molar and premolar region does not exist. (Imagine a person being a mouth breather who

rests the lower lip against the lingual surface of the upper incisors a great share of the time.)

Now let us turn to those cases of Division 1, Class II, with arrested vertical development in molar and premolar region in the extreme as exemplified in Figs. 8 and 9. Mouth breathing never existed here as a causative factor and if present at all it was because of the difficulty of closing the lips. The lower incisors closing against the lingual surface of the upper incisors and on the gingival tissues lingual thereto has caused the protrusion of the upper incisors. The beautiful incline plane thus furnished by the lingual surfaces of the upper incisors and the premaxillary bones of the maxilla for



Right Left

Fig. 5.

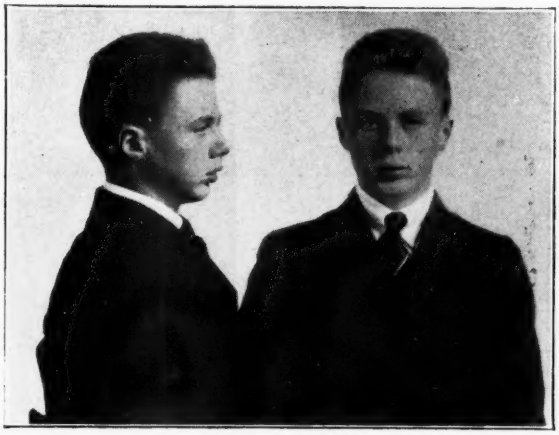


Fig. 6.

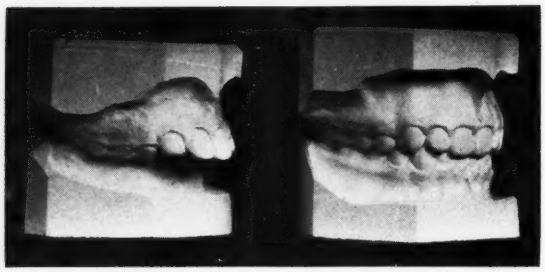
the mandibular incisors to slide upon has caused the mandible to take a position distal to normal. In Figs. 10 and 11 are shown the vertical development in molar and premolar region obtained during treatment, and Figs. 12 and 13 are the portraits of the case. The casts on the left in Fig. 8 were obtained two and one-half years after all appliances were removed. It is reasonable to suppose that this continual impact of the occlusal edges of the mandibular incisors against the premaxillary region of the maxilla is responsible for many cases of excessive development upward and forward in the nasal region which is frequently found in these types of malocclusions.

In the cases of malocclusion with arrested vertical development in the molar and premolar region belonging to Class II, the causative factors are the same, the functioning of the lips being the controlling influence as to

whether the malocclusion shall be that of Division 1 or Division 2, mouth breathing not entering as a factor. In those types of Class I with protruding maxillary incisors and retruding maxillary incisors, like those of Class II, the causative factors and controlling influences are also the same, and the reason



Fig. 7.



Right Left

Fig. 8.



Fig. 9.

they remain in Class I is due to the foreshortening of the mandibular dental arch anterior to the first molars.

In Division 2, Class II, the functioning of the lower lip is undoubtedly accentuated by the combination of arrested vertical development, foreshortening of the mandibular arch anterior to first molars (the latter frequently due to premature loss of deciduous molars), a tipping lingually of the mandibular incisors and the distal position of the mandible. The vertical length

of the lower lip thus resulting, unduly engages the maxillary incisors and the lingual inclination of the latter results.

In some cases, the alveolar process in the region of the apices of the roots of the maxillary incisors appear to have been forced anteriorly through occlusal impact of mandibular incisors upon the premaxillary region. A typical



Right Left

Fig. 10.



Right Left

Fig. 11.

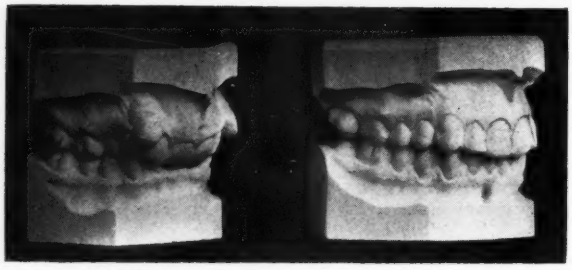
case is here shown in Figs. 14 and 15. In this illustration, there appears to have occurred an anterior movement of all the teeth in the lateral halves of the maxillary arch, those in the right half, the width of a cuspid and premolar, and those in the left half, the width of a premolar. Upon an analysis of the facial lines, Figs. 16 and 17, however, and an intelligent treatment of



Fig. 12.

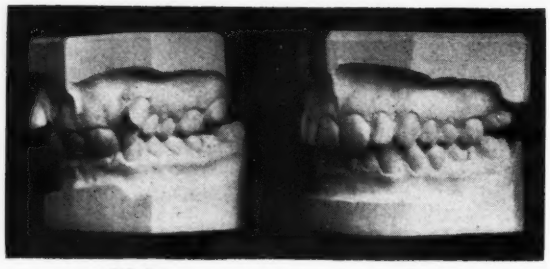


Fig. 13.



Right Left

Fig. 14.



Right Left

Fig. 15.

the case, it will be found to have been apparent only and what actually exists is an arrest anteroposteriorly of the entire maxillary dental arch. There is even now insufficient room for the second molars to assume their proper positions with the impactions of third molars complete, as can be seen in the casts on the left of Figs. 14 and 15. If it were possible, the ideal treatment would be to move the maxillary dental arch still further labially, following with a still further movement anteriorly of the mandible. The very prominent appearance of the nose would thereby be greatly reduced as well as a better appearance would be given the chin.



Fig. 16.



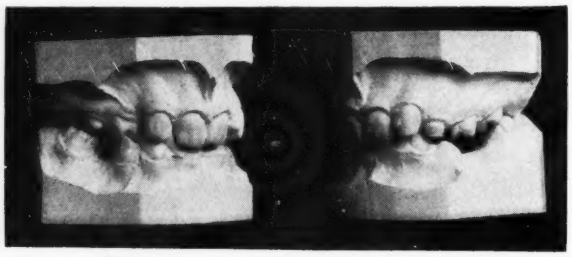
Fig. 17.

Passing to the second division in which mutilation, absence of teeth, and in some cases, possible bone cell disturbance appear as contributing factors: Foreshortening of the dental arches anterior to first molars is one of the features.

Where malnutrition and bone cell disturbance may appear as a factor in malocclusion of the teeth in the types here under discussion, they are easily distinguished by the unusual appearance of the case presented. In fact, they are in a class by themselves and should not be confounded with the true type of arrested vertical development. In Fig. 18 is shown a typical case; that of a girl of fifteen years of age. It will be noted that the mandibular and maxillary arches proper appear not to have been affected by the disturbance to dentition, the excessive vertical overbite being due to the unerupted

teeth. Dentition was most difficult and slow. The mandibular left first and second premolars, the right second premolar and maxillary first molars had to be mechanically assisted in their eruption although not impacted in any way. The maxillary lateral incisors are congenitally absent.

In the course of the study of this subject, I became quite impressed with the wisdom of nature in utilizing, in her great scheme of things, this vertical development and the vertical overbite, in varying degrees, in compensating for discrepancies in the amount of tooth substance existing in either arch anterior to the first premolars. If there were a lack of sufficient tooth material in the maxillary dental arch, the vertical overbite would be lessened. If the discrepancy were in the mandibular dental arch, the overbite would be



Right Left

Fig. 18.



Fig. 19.

increased. It is by varying the vertical overbite in connection with the horizontal overbite that nature can and does adapt different types of teeth to the same type of an individual. I have taken advantage of such knowledge and applied it in the treatment of cases where mandibular incisors were absent or in cases of improperly formed maxillary lateral incisors with most gratifying results.

In division three, those cases wherein the lack of sufficient vertical development may possibly be due to an arrest in the lateral development of the dental arches, the degree of vertical overbite is not very great. The number of such cases, however, are quite large and are more commonly of Class I. Whether this type is the result of some interference with the lateral development only, resulting in an arrest in the vertical development, or whether

it is just an arrest of vertical development in molar and premolar region is not as yet quite clear. Indications, however, point to the latter, as broadening of the arches is not sufficient in many cases to produce sufficient vertical arrangement. It will be seen therefore that a mere widening of the dental arches will not be sufficient in many cases to assure permanency in the ideal treatment and is often exemplified in those frequent relapses wherein there is an overlapping or crowding in the mandibular cuspid and incisor region, extending at times to the same region in the maxilla. This resulting condition, no doubt, accounts for the use of the term, "Individual Normal."

In the fourth and last division, we have arrested vertical development in molar and premolar region in combination with an arrest in the horizontal direction of the anterior portion of the mandible proper. There are those, I am informed, who believe that all or almost all mandibular retrusions of the types heretofore mentioned are of prenatal origin and attempt to prove their contentions by radiograms. It is quite apparent that one of such beliefs has had little or no experience in observing the development of children from birth to adult life. The mandible at birth is naturally distal to the position it will assume upon the development of the deciduous dental apparatus. Again, the very nature of the x-ray (being a light so directed as to cast a shadow of an object upon a sensitive film) and the position and development of the fetus are such as to preclude the possibility of determining whether the mandible is normal or abnormal in its position or development. That there are some cases of arrested vertical development in molar and premolar region of prenatal origin, I am not denying, but in all such cases there exists an arrest in the development of the mandible proper anterior to the first premolars. In contradistinction to those originating otherwise (while the treatment if begun very early in life can prove materially beneficial), there will always remain well defined traces of the arrested mandibular development impossible of eradication. In this seven months old baby, Fig. 19, is seen a typical prenatal mandibular retrusion but, as in all such cases, the mandible is undeveloped. Observation as to development, use and treatment will be most interesting in this case.

Nature, in her great scheme of things (all things working well), has not only planned that the mandibular incisors shall be the guide as to the extent of vertical development but also, because of the necessary excursions or mobility of the mandible in the processes of incising and masticating of food, that the teeth shall be placed in a manner so as to sustain the mandible in its proper relation to the maxilla; hence the ball and socket arrangement, or what is known as the curve of Spee.

The prosthodontist lays great stress upon this feature in the constructing of his artificial dentures and likewise should the orthodontist in the reconstruction of the occlusion of the teeth and not endeavor to destroy it for it will prove of great aid in the maintaining of the proper mandibular relation in cases of the types under discussion. There should be this point of difference, however, in the case of the prosthodontist, the maxillary first molar, I believe, is designated as the lowest point in the convexity of the curve, while in the case of the orthodontist, the maxillary first premolar should be the

lowest point. Owing to the settlement that usually takes place after regulating appliances are removed, I find it good practice to accentuate the convex curve, even to the extent that the maxillary first premolar may appear in some cases as being in supra-occlusion; the ideal result desired will be more certain. How often we see "illustrated" treated cases of malocclusion of Class II in which the vertical arrangement of the teeth are left in the manner as shown in the cast on the left of Fig. 20. Compare it with that on the right and you will see one of the reasons for some of our failures, particularly when rigid retainers are used. What a feeling of security one must have that the mandible will remain in proper position if the arrangement of the teeth are as depicted in the cast on the right of both Figs. 20 and 21.

The possible changes in the mandible, the temporomandibular articulation, and the movement of the teeth in the dental arches in cases of distoclusion are much mooted questions. There are some who believe that the change takes place in the temporomandibular articulation, others, that it



Right Left

Fig. 20.



Right Left

Fig. 21.

takes place in the angle or ramus of the mandible, and still others who believe that the teeth shift in the alveolus with a changed position of the mandible. The writer places little credence in the last-named theory, and believes that if any shifting of the teeth does occur, it is long after the distal position of the mandible has taken place. Further, after years of study and observation of the developing dental apparatus, noting the suddenness with which the mandible changes its position both bilaterally and unilaterally, and the early age at which it occurs, he has concluded that what actually takes place is a change in the relation of the condyle head to the glenoid fossa. The synovial membrane and articular disks make such possible with a bending or twisting of the neck of the condyle and a possible change later in the angle or ramus of the mandible.

This capability of the temporomandibular articulation in very young children to adapt itself to forced changes in position of the mandible accounts for the conditions known as subdivisions or bilaterally distal occlusions and is nothing more or less than a bodily rotation of the mandible with

a bending and twisting in the neck of the condyle and changes in condyle head relation. As the inception of these distoclusions usually occurs before the eruption to occlusal contact of the first permanent molars, in the study of the subject by use of skull and mandible, the skulls and mandibles should be of children under eight years of age, with the synovial membranes considered as an important factor. The adult skull should be used for comparative purposes only. The writer believes that the synovial membrane in the temporomandibular articulation has other functions than those commonly attributed to it.

The failure of a maxillary first molar in its process of eruption to change its position sufficiently from its lingual inclination to a buccal inclination is sufficient to cause a rotation of the mandible in the opposite direction when accompanied with arrest of vertical development in molar and premolar region. Even a slight lingual rotation of the maxillary first molar may cause such a rotation of the mandible, likewise the mandibular first molar. An example of this occurred in a case referred to me from another city in which the deciduous second molars were used as anchorages for appliances. From the models, it apppeared as Class I, but during the treatment the mandibular second deciduous molar of the left side became displaced buccally through the appliances with the result that the erupting first molar of the same side was deflected and rotated lingually through an incline plane thus formed, with the further result that the mandible was rotated to a distal position of opposite side.

The variable vertical arrangement frequently assumed by erupting mandibular incisors will create an incline plane which will often result in a unilateral distal occlusion. The side thus affected will be in a direction of the highest point of the incline.

Dr. Harvey Stallard of San Diego, California, who is doing a most wonderful work in his study of pillowing habits as factors in producing malocclusions of the teeth, particularly as to positions of the mandible, suggests that some of the conditions herein discussed may be due to the pillowing habit. While I believe that the work Dr. Stallard is doing will result in bringing to light many now obscure causative factors, his application, however, is too general and does not, in my opinion, apply to the conditions under discussion. I will state here that, in the examination of skulls with mandibles intact of the early Peruvian, California and Nevada Indians and a few Egyptians in the collection of the Museum of Anthropology of the University of California (the skulls of a number of young children among them), such a thing as arrested vertical development in molars and premolars did not exist. What an examination of the early Caucasians would reveal, I do not know as I have not as yet had an opportunity to get in touch with a collection of any importance.

After a careful survey of my failures and those of others that it has been my privilege to see and hear of, I am convinced that many of the failures in orthodontia today are due entirely to a misunderstanding of problems surmountable, the most conspicuous of which is *arrested vertical development in molar and premolar region.*

If we are to be really successful in the treatment of our cases and wish to reduce the tremendous percentage of failures that now confront the orthodontic profession, we must approach the study of malocclusion of the teeth at a somewhat different angle than has been the case of late.

We must revert somewhat and place more importance in mechanical and environmental factors. Let us be a little more conservative. Why delve into the realms of the unknown for causative factors which so far have led only into uncertainties and confusion, at least, until after we have once and for all eliminated or placed definitely, mechanical and environmental factors where they belong? Study the excursions of the mandible for it was by such means that the prosthodontist made such wonderful progress. He is now leading the orthodontist. And may I suggest, in closing, that less time be given to the invention of regulating appliances of doubtful efficiency and more thought and study be given toward developing a method of determining the force applied which is now largely a matter of guess, particularly as applicable to the molar region. No other profession than orthodontia would handle so wonderful a mechanism as the dental apparatus in so unscientific a manner.

INTRODUCTION AND DISCUSSION

Dr. Robert Dunn.—I wish to apologize to Dr. Abell for not getting to him in ample time, proper material for him to use in the preparation of his discussion of this paper.

After listening to the paper by Dr. McMillan, I felt very much elated because it bolstered up, in a way, some of my findings. Then after hearing the paper by Dr. Blair I wondered, that if you accept his ideas, whether there is any necessity of presenting my paper, because according to him, we don't need any condyles; we can cut them all off.

Dr. Dunn read his paper entitled "Vertical Overbite."

Dr. Burt Abell.—Dr. Dunn's paper again brings us face to face with one of the most difficult problems of orthodontia, if not the most difficult one. Like a true scientist, he has followed the admonition flashed up to us on the cover of one of our dental journals, "Observe, Compare, Reflect, Record," while many of us have to confess to an omission of a link in this chain that has landed us only in a Slough of Despond from which we can but raise an SOS., as I do now, as my excuse for appearing before you to lead the discussion on so able and thoughtful a paper. I shall assume that the one who opens a discussion is not required to cover all the points treated. I do this in self-defense, for Dr. Dunn has taken me beyond my depth in a number of places in his paper. I leave these for wiser heads, but I beg the privilege to do as he has intimated he should do: i.e., "Because of the opportunity afforded—take the liberty to digress from the subject to express some of my views," taking care they are pertinent and do not go too far afield. No attempt is made to discuss the points in the order in which Dr. Dunn treats them.

In the few days my copy has been at hand the absence of the illustrations may have made me miss some of the points, but I have gathered these, concerning which I can but register here my impressions and ask for fuller explanations and proofs—some of his statements are so drastic they are staggering.

I quote, "It is a singular fact that in the development of the dental apparatus the mandibular incisors are invariably normal in their vertical arrangements"—"They are intended as a guide or fixed point by nature in her process of vertical development in the determination of the vertical overbite." This is a most valuable hypothesis if true. Will Dr. Dunn tell us how he arrives at this conclusion? It seems to me one can arrive at such a conclusion only after most careful investigation, not of such cases as come to us for correction, but of a great number of cases that need no attention from the orthodontist. Even then, what is the basis for such a statement pending the completion of the erpution of the whole set of teeth? Years ago Dr. Angle set the whole orthodontic world agog with his con-

tention over the position of the upper first permanent molar as a basis for our operations. In the minds of some that point isn't settled yet. As I read Dr. Dunn's paper he has attempted to give us a second landmark from which to chart our course. I quote again, "Stated rules and measurements as aids in diagnosing have little or no place in the practice of the man who has a true conception of orthodontia. We must liken orthodontia to the arts of painting and sculpturing,—the true orthodontist, like the true painter or sculptor, is not made to order." Does he arrive at his conclusions as an artist or as a careful scientist? This is not asked in a spirit of criticism at all, but from a desire for something solid to stand on in a morass of trouble. If unhampered, "The mandibular incisors *invariably* (a most comforting word), arrive at the normal vertical arrangement" (a word needing explanation also, but I take it the proper level for the type of face and temperament, is meant), and, "When forced by mechanical appliances to positions of infra-occlusion will invariably return after being released to their typical vertical arrangement." If this is so, I say, our chief concern should be the removing of any hindering influences to their freedom to assume "normal" positions. How careful we should be not to disturb them lest we be misled in arranging the rest of the teeth. Of what crimes in this respect have we been guilty in the past? What a comforting thing if per contra when forced out of this normal by the malpositions of other teeth they showed the same tendency to return to "normal" when the disturbing influences have been removed. When forced back, as undoubtedly they must be, to a "normal level,"—whatever that may be—will they "stay put," or has the overdevelopment of the supporting tissue of these diagnostically important mandibular incisors destroyed this "homing pigeon" instinct (pardon the term) for the normal, and become, like Goldsmith's "Bold peasantry, a country's pride,—when once destroyed, can never be supplied"?

While the dominant note of this paper is "Diagnosis," it is pertinent to say that be our basis for arrangement of the teeth what it may, mandibular incisor "normal arrangement," facial balance and artistic sense of proportion—what not—our interest centers in whether we can make this arrangement permanent. Dr. Dunn hints at the secret when he discusses under another heading in his paper the curve of Spee. If I have any criticism to offer it is, he does not seem to carry his discussion far enough here, but takes too much for granted as to our intelligence in the matter. (I looked twice at that word "intelligence" after I wrote it down, but am going to let it stand.) How many of us pay any attention to the curve of Spee in our final arrangement of the teeth, but trust to the influence of occluding cusps to somehow or other readjust and harmonize any little inharmonies of position we may have left? This may illustrate a sublime "trust in God," but we fail to have the good sense to "keep our powder dry." Some of us "soothed and sustained by an unfaltering trust, lie down to pleasant dreams," but we have a rude awakening later on.

Dr. Dunn speaks of the ball and socket arrangement of the curve of Spee. It is just here I want to register my criticism. I fear he has not looked up the definition. May I give it to you? The curve of Spee is, "A curved line touching the summits of the buccal cusps of the upper or lower teeth from the first bicuspid to the third molar, corresponding more or less accurately to the arc of a circle, the center of which lies behind the crista lacrimalis posterior and the line bisecting the horizontal plane through the orbit." Now, here's the crux—the curve of Spee lies in a *plane*—the curved base of a triangle of which the apex is a *hinge*, not a ball and socket. We often forget that, and if we regard the curve of Spee at all in our arranging teeth we often let it go at that. The prosthodontist, from the necessities of the case, has been *compelled* to find a cause for his failures,—the consequences of his mistaken arrangement of teeth is visited upon his head instanter—and he has had to provide for a *lateral* excursion of the mandible and a definite and accurate calculation involving a proper relationship of incisors, bicuspids and molars as this *lateral excursion* takes place. He not only must preserve the curve of Spee in relation to its plane but provide for the lateral swing of the *whole plane*, nicely calculating the apex of the plane and its excursion. In other words, he must consider the *third* dimension. Shall we, because we have a different and a living attachment for our field of operations disregard these basic laws of engineering and yet hope for permanency? It would do us all a mighty heap of good to take the best course we can find in prosthodontia so far as it teaches the

proper arranging of teeth. To use the expression of the street, "They've got it all over us," when it comes to regarding the laws of tooth arrangement.

Let us interview any good periodontist and he will tell of case after case of pyorrhea (pardon me, periodontoclasia) caused by an *enforced vertical hammering* of the tissues due to malarrangement of the teeth, and if he is a "radical" and goes to the root of the matter, and as soon as he can, he *grinds those teeth until* there is entire freedom of motion in every direction.

It is unthinkable that we should call our case finished if in an attempted lateral excursion of the mandible the cuspids *foul* or there is traumatic stress anywhere. A discrepancy in the amount of tooth substance in the maxillae and mandible warrants, many times, the *orthodontist's* grinding the teeth to secure this freedom and relieve this traumatic stress. Then and then only can there be proper function of all the parts and a reasonable hope for permancy.

It is to be regretted that Dr. Dunn's investigations have not reached the point where he can give us something more definite concerning the suspected changes at the condyle head and neck and glenoid fossa. May we hope he may give the results of his further findings at some future meeting.

I find I am much in accord with the recommendation that the experiences of successful practitioners be *compiled for reference* to be used by research workers in conjunction with data of a biologic and correlated scientific value. In 1923 in my presidential address you will remember I recommended a librarian be appointed by the Society to care for just such matters. I am glad that at this meeting such an office has been provided for, but I feel the appointment should be permanent and given to one "sold on the proposition" who should obtain and file the results of such systematic records as Drs. Lischer and Wheeler and others have told us they have. He should keep up a continuous propaganda to spur us laggards to the keeping of more systematic records. Such a compilation would be invaluable to one responding to the call of our Board of Censors in arranging a program. They could determine what subject they wanted covered and by reference to data in the librarian's hands determine the best man for the "job" and he would find his material largely at hand to supplement his own findings. Further, I want to add that this compiled material should be located at some center of orthodontic instruction available to undergraduate as well as postgraduate students. If such a compilation is desirable, I believe the American Society of Orthodontists is logically the one to officially carry it through.

In trying to think straight concerning the bearing malnutrition and constitutional diseases of children have on the types of malocclusion under consideration I find I cannot disregard some basic facts that lead me to a different conclusion than the essayist. In malnutrition we expect and usually find growth of the whole anatomy inhibited *except the teeth* which apparently erupt with as large crowns as though the subject were properly nourished. This inhibition of growth necessarily affects the *length* of the ramus, making it shorter. Well or improperly nourished, the child incises his food whatever else he many or may not do with it afterwards. The problem becomes one of mechanics from now on. Given a hinge at the temporo-mandibular articulation and the upper and lower incisors in apposition, with a *short ramus* and at any given point between these two, the distance between the upper and lower jaws *must* be shortened, and as these molars and premolars erupt this more or less constant closing of the jaws mechanically prevents their eruption to their full height. Granted a program of vigorous chewing might so develop and lengthen the *ramus* that these molars and premolars might have room to develop vertically—but—it would seem reasonable to *believe* (I don't just see how we would go about it to prove) that our "external stimuli" *first* develops the *ramus* before there can be a response from the supporting tissue of the teeth.

If it be true that external stimuli will promote vertical growth, whether it be in one or the other, why not systematically prescribe a systematic course of chewing more or less resistant substances? Years ago Dr. Young reported he did that. I wish he would give us a report on the results. Dr. Ferris has little rubber dumb-bells made to give his children, directing them to chew on them, especially where the teeth are sore, and finds the soreness subsides. If physiologic results follow their use there, wouldn't they also follow if used to promote vertical growth in the molar and premolar area? There used to be a so-called

orthodontia gum made for this very purpose—why not prescribe that? Or insist on the chewing of rubber rope?

This matter of *prevention,* so far as may be, of these malocclusions leads me to the airing of a pet hobby of mine, with which I will close this attempt at a discussion. Certain types of malocclusion are often found to occur in more than one child in a family. The parents usually bring for treatment the older one because of the advanced stage of the trouble. My contention and belief is that we are perfectly justified, in an ethical way in so arousing the interest of the mother (or parents) and explaining how it might be prevented that she will be so concerned about the *neglected ones* that she will seek to know the status of *their* cases and immediately set in motion *preventive* measures. I believe it is perfectly legitimate to invite the presentation of the younger children in the family for inspection, and to advise the parents as to what should be done to save the dear kiddies the misfortune of neglect, at least neglect due to ignorance.

I want to thank Dr. Dunn for his paper—it deserves a much fuller and better discussion than I am able to give it, but the rest of you now have a chance to do him and the paper justice.

President Howard.—The paper is now open for general discussion. There is so much here to discuss, I don't see why anybody should wait.

Dr. G. W. Grieve.—I did not desire to be the first to follow Dr. Abell in the discussion of Dr. Dunn's paper, but, rather than have any delay waiting for some person else, I shall continue "rolling the ball."

One of the most forceful things in Dr. Dunn's paper, in my opinion, is that he says he is convinced that lack of vertical development in the posterior region is responsible for many of our failures. I think Dr. Dunn's paper is a very valuable one, and in that one particular statement, to use a common phrase, I believe he has "hit the nail on the head."

Another point which struck me very forcibly was the statement that he does not think it is possible to get development in the mandible anterior to the first premolars. Am I quoting you properly there, Dr. Dunn?

Dr. Dunn.—Yes.

Dr. Grieve.—As I understand Dr. Dunn's statement, he intended to convey to us the thought that we cannot get forward growth of the mandible anterior to the first premolars. Is that right, Doctor?

Dr. Dunn.—Yes.

Dr. Grieve.—We may not obtain growth in that particular region, but I am convinced that we can forward growth of the mandible in those cases where there is a lack of that growth, or where the mandible occupies a position distal to normal in its relation to the skull. The growth will take place posterior to the teeth, and thus carry the anterior portion forward.

Where we have a distal position of the mandibular teeth in their relation to the maxillary teeth, in the deciduous denture, that is the time to remove any interferenc and make conditions favorable for normal growth and development.

I believe the young gentleman whom Dr. Dunn says is a coming statesman from California, whose picture he showed us, has a lack of normal growth of the mandible; if the treatment of that case were such that normal growth could be obtained, Dr. Dunn would not hesitate to meet him on the street.

Dr. Dunn.—Relative to that case, that was treated many years ago and the vertical development was not obtained. It was only apparent. I thought I had it, but I didn't really. That was the reason for showing it on the screen.

Dr. Grieve.—I quite understand that many of these cases were treated some time ago, and I am not (don't misunderstand me) criticizing Dr. Dunn at all. I would just like to call your attention to the fact that there are possibilities now, I believe, of obtaining the normal growth which will help us out very wonderfully in these cases.

Dr. Dunn.—There undoubtedly are, and I could make the change now in that particular case.

Dr. Grieve.—Dr. Dunn, if you will go back to my first remarks, I stressed your statement that lack of vertical development in the posterior region was responsible for many of our failures, and this particular case very clearly illustrates your point.

I think in several of the cases that Dr. Dunn showed there was no doubt about the lack of forward growth of the mandible. I noted that several were of the second division of Class II. I don't know why, but I have had very few belonging to this group. I would much prefer to treat those cases of the first division, probably because of having had more experience with this type, but I am convinced that in cases of the second division the pressure of the maxillary incisors back against the mandibular ones prevents the normal forward growth of the mandible more markedly than in any other type of malocclusion, and those are the cases where the interference should be removed as early as possible.

Dr. Dunn spoke of the suddenness of the change in the mandible, whereby almost overnight it will drop back. I think a great many of us have noted this fact during the treatment of our cases. In some instances I considered that I had Class I cases, and suddenly it became quite evident that they really belonged to Class II.

In Dr. Abell's opening of the discussion, he spoke of the interference of the cuspids to the excursions of the mandible. I am convinced that in many cases the cuspids are in supra-occlusion, or there is a lack of vertical development of the premolars and molars. The cuspids in these cases are certainly great obstructors to maintenance of the normal relations which we endeavor to establish. It is my practice in many of these cases to intrude these cuspids, and it is very important that the full expansion of the mandibular teeth in the anterior region is obtained. I think that the last vestige of retaining device to be removed should be that from the mandibular teeth, in order that the lateral expansion may be maintained long enough, in conjunction with normal lip function, to prevent any elongation of the maxillary cuspids carrying the mandibular cuspids lingually. Until such time as we have succeeded in assisting nature to establish the whole mechanism in normal relations, the cuspids, if not properly placed, are great distributors of occlusion.

Where the vertical growth is not sufficiently obtained, and maintained, the mandibular cuspids are very prone to drop lingually, and the incisors along with them, and you get a crowding of all anterior mandibular teeth, and a consequent falling down of your case. In Class II cases I think that is the first intimation you have of failure.

Dr. Abell spoke of vertical development by means of systematic exercises, and so forth. I think that is very important, but care must first be exercised in our treatment to make conditions favorable for those exercises to be of the greatest possible benefit.

President Howard.—Does any one else wish to discuss this paper?

Dr. J. L. Young.—I want to say just a few words. I agree with our essayist that intra-occlusion, too deep overbite, is one of our most difficult problems, and I am going to suggest that every member of this society try to make an effort, wherever possible, to get a set of good, accurate impressions, and make casts of cases that they consider are normal, that have never had any orthodontic treatment, and also photographs, both profile and front views of the patients.

I have in my possession about eight sets of casts of practically normal occlusions that have never been interfered with in any mechanical way. I must confess that I have failed to get photographs. Some of them I think I can get photographs of. In every one of those cases I find a very short incisal overbite.

Dr. Henry C. Ferris.—I want to thank Dr. Dunn for bringing this subject before us. I cannot answer any of his questions with reference to the curve of Spee, but I believe that there is a tremendous amount of work to be done on this subject which would be of inestimable value to our specialty.

We have formed a combination in New York of periodontists, orthodontists, and prosthodontists to study this problem. The one point of general interest has been the localization of trauma and the reestablishment of universal contact of the teeth, which necessitates the careful consideration of the curve of Spee.

We started our research with the use of a Wadsworth articulator reproducing the conditions in the mouth on this instrument from which we made our diagnosis and studied our procedure. The information obtained from the study of three or four cases proved to

be very instructive, emphasizing the value of the curve of Spee to the normality of the tissues of the mouth.

The statement that Dr. Dunn has made in reference to leaving his cases with an inverted curve of Spee comes to me as a shock. I have done everything in my power to establish the normal of the curve of Spee, and think almost everybody is endeavoring to do the same, but to purposely leave my case with an inverted curve would be counter to my best judgment.

I would like to speak on the subject of muscle training or the use of exercises for the development of the growing structure. First, I will give you my personal experience with my method on my growing family, as I have lived long enough to see four children develop into maturity.

For seven years during my greatest enthusiasm, I insisted upon having all their bread hard-dried in an oven, which demanded excessive mastication of the carbohydrates. It took no little perseverance to have this system adhered to in the kitchen, as it was somewhat painstaking, but it resulted in normal occlusion for my two oldest children. While the two younger ones were going through this period, my enthusiasm waned, and the system was interrupted and they both developed slight malocclusions (Class I, Angle) and required appliances to direct their teeth into position.

They have all developed normal occlusion and have excelled in college athletics, all receiving from one to three "C's"; the youngest being captain of the Columbia crew.

I have models of these children's teeth at six, twelve and twenty-one years of age.

After this experience, I recommend this method to every mother whose child comes to my attention. I add to that, one other suggestion; that is, that they have no water served during meals, which permits the thorough incorporation of the carbohydrates with the saliva. I do not allow that at the present time at my own table. The glasses are on the table, but the servant does not fill them until the meal has been finished.

This practice gives nature a chance to stimulate through the gustatory nerves the normal function of the several glands that supply the salivary secretion. If you allow the child to wash his food down with water, or milk you interfere with the first function of physiologic reflexes and lose the nerve stimulus for the gland to perform its normal trophic reaction.

Many of the patients will carry out the recommendation for a short period, but you will find it necessary to check them up from time to time.

If the function produces stimulation of the secretory glands, it naturally increases metabolism of the carbohydrate food, which is the heat producer in our body and a stimulus to the entire osseous growth. It stabilizes the patient's physical system, and I oppose the sentiment as expressed that we deny our patient that stimulus until we have finished two or three years operation. If I have overdeveloped muscles, due to malfunctioning of inclined planes, that is my problem to solve.

In many instances, I overlay deciduous teeth with gold and also introduce artificial plates where the deciduous teeth have been lost prematurely from any cause, if only for a short period.

I consider this practice of great value to the growing child.

Dr. A. H. Suggett.—I enjoyed this paper very much. I am quite familiar with Dr. Dunn's work, as I live in the same village with him, and I can testify to the fact that he is an expert technician, and he has obtained beautiful results.

The only point in his paper on which I would disagree with him is his plea to return to normalcy, and his conservatism in warning us against "delving into the unknown." I thought we were making an effort here toward research work, to try to find out some of those unknown things that have been bothering us. Therefore, I can hardly reconcile his expertness in manipulation with his method of diagnosis and his plea for conservatism in that direction.

Dr. C. A. Spahn.—I want to compliment the gentlemen who correlated all the work that has been given here during the last three or four days. I am just a guest, but still I have had great difficulty at times in refraining from saying something in relation to certain topics that have been brought to your attention. Dr. Dunn's paper has impressed me

so much, and everything that has been said in relation to it, that I feel I would like to voice my views in relation to several details that he has shown.

Whether he has used any method of recording the infraposition of the molar teeth, I don't know. I did not hear him say that he had; however, no doubt he has arrived at his method of diagnosis through a process of long observation, the results of treatment and the reporting of his finished work, which is, after all, the one thing that we must consider even before we start the treating of our cases.

In regard to his statement about the height of the incisor teeth, I have felt so much alone with that problem that at times I feared to make a statement corroborating his findings, because I could not prove it sufficiently or in a substantial way so as to convince my friends. For that reason I have not advanced this method of diagnosis sufficiently before many men.

As I said before, whether Dr. Dunn uses any method of measurement, I do not know, but I have used a method of measurement in all of these cases, particularly where a full complement of teeth are present, or nearly so, we will say twenty-four or twenty-six teeth. If a patient is somewhere near thirteen or fourteen years old, whatever we do, must be brought about in a short period of time, this being a bone growing period that we all look for, and which facilitates the finishing of our treatment satisfactorily.

So in order to determine the position to which I am going to move teeth, whether it be into a facial position or into a supraposition, I first take into consideration the position of the mandible as it is located in the glenoid fossa.

The method of finding out the position of the mandible isn't difficult; it is very easy Also, to make certain measurements from a given point (it may be any given point above the occlusal position of the teeth) it isn't a difficult matter to determine then how much these teeth are to be elevated in order to bring about an occlusal curve, if you will, or the curve of Spee that would be normal or somewhere near normal for that individual.

Dr. McMillan's work, Dr. Grieve's paper, Dr. Waugh's discussion, and I think everything that I have enjoyed here during this meeting has a direct bearing upon what Dr. Dunn has told and shown us about his work. All of this can be very closely related.

Unless I have a visual idea of what I intend to do before beginning my case, I can't very well go on with the treatment. All these measurements have been made of the occlusal position of the teeth, and Dr. Dunn's experience, or his findings, certainly compare favorably with what I have found with this method of measurement.

If the posterior teeth are elevated and brought out laterally to a harmonizing position with the curve that can be visually examined with instruments, as has been mentioned by Dr. Ferris, we certainly all will have a better and a more comprehensive visual idea of what our treatment is going to be.

The question of retention, it seems, is more or less solved when the occlusal plane of the posterior teeth is brought up to a point that will only permit very slight overbite of the anterior teeth.

In no instance during a period of three years examining of the height and position of teeth through a process of mounting on an instrument that will carry on the movements of the condyle path, have I ever found central incisors or, if you will, I might say a tooth in supra-occlusion or supraposition, unless we had present a pathologic condition of some nature other than is ordinarily found in the average distoclusion cases. This statement, therefore, contradicts the method of depressing any teeth in the treatment of any ordinary malocclusion.

I thank you for the privilege of discussing this paper.

President Howard.—Does someone else wish to discuss this paper? If not, I will ask Dr. Dunn to close.

Dr. Robert Dunn.—I fear that I may have been a little bit premature in presenting this subject at this time, but when I was asked by Dr. Young to prepare a paper, in the time that was given me, I didn't know what else to present to you. I am going to do as Dr. Blair did in a measure and hide behind that alibi: "My observations and experiences."

My determination that the arrangement of the mandibular incisors, in answer to Dr. Abell's point, is invariably typical, or may we say, normal in their vertical arrangement,

was arrived at by the process of treating cases and observing the conditions in connection with the facial lines and the ultimate results. I have not pursued any method of measurements as yet because I can't see where they would prove of any benefit because of their inaccuracy. I don't know where you could possibly select a point from which to measure the mandible of the living subject and have it apply to all types with any degree of accuracy.

I am sorry that I could not, at this time, bring more positive proofs, which the Doctor says he ought to have, but I am hoping that at some time in the near future I shall be able to give you something that will be more definite so that you won't have to simply take my word for what you have heard.

The term "curve of Spee" was used merely to bring out the point I wished to make in reference to that curve we should obtain if we are going to maintain the position of the mandible as desired. I do believe, however, that it is a sort of ball and socket arrangement when you consider the excursions of the mandible and is for the purpose of maintaining the proper relation of the mandible.

If you ever study the Indian skulls, you will notice that after the teeth are worn down, they have almost a flat plane that results (not always, but frequently) in an irregularity in the incisor region, which denotes a disturbance in the mesiodistal arrangement of both the mandibular and maxillary teeth.

Relative to the inverted curve of Spee that Dr. Ferris brought up, I stated that was not intentional. It was done in my earlier treatment in the effort to overcome the excessive overbite, in the belief that the depressing of the mandibular incisors was all that was necessary. It was incorrect, however, and the only thing that made the case a success was the fact that it was retained long enough to let nature have a chance to reverse the condition, which took some time I assure you. You have seen a lot of cases thrown on the screen at this meeting where that was brought about in present-day treatments and the result of which will prove anything but satisfactory.

With reference to Dr. Suggett's statement: I didn't intend to convey the thought that we ought to give up research work and delve into the realms of the unknown entirely, but we have so many mechanical and environmental factors that it seems to me ought to be understood before we get into those subjects; that was my point. Let us do away with them first and then take up these deeper subjects because we are not getting anywhere.

THE TEETH AND HABITS OF THE SIWASH

By E. H. Stanley, D.D.S., Bellingham, Wash.

SOME thirty-five years ago the United States Government conducted a series of experiments with a view to bettering the condition of the Siwash. The tribe coming under my notice lived at Neah Bay, in the northwestern part of the United States. Although the Macah Indians were noted as being splendid examples of stalwart men and fine women, the authorities placed the young of the tribe in dormitories where they were trained to eat at a table and sit on chairs, to use a napkin, sing hymns, and ask a blessing, and to deport themselves generally as white children.

After two or three years of this experiment it was noticed that the teeth of all these wards of Uncle Sam were found to be decaying at an alarming rate, and an investigation was decided upon.

I was living at Port Townsend at the time, in general practice. The Indian agent at Bahada, two miles from the Indian village, wrote me to find if I would take time to make a trip to Cape Flattery and conduct an inquiry, or examination for the government. I spent a month at the agency.

There were some eight hundred of these wallipers, old and young, to be examined. I dated the call early in December, and word was passed to the tribe that they should get ready for dental examination, or inspection. I arrived at Neah Bay late one dark night on the old steamer Garland. There was no wharf, so the steamer came to a halt a mile out, where a huge war canoe met us. This canoe was manned by the best paddlers there—which means the best in the world—and although I was a stranger to them, they seemed to know my mission. They clucked and pointed to their teeth and then to me. As the canoe neared the shore a dozen young stalwarts splashed out with a long rope which they attached to our canoe, and we were slid up the sloping sand to a high landing.

The month of December was then the annual Potlach time and many guests from neighboring tribes were gathering for the fun. Some two hundred came on the same steamer I did. I did not wait for the rest to land, though I should have liked to, and the team from Bahada whisked me up the beach to where I was to conduct my unique dental service.

The next morning I began the examination. Two of the teachers acted as clerks and were shown how to make the markings, together with the name and age of each Indian. The tribal extravagance allowed only one name to each, such as "Lucy," "Anna" and "Ella." These were duly recorded with the ages and number of teeth decayed. Two young women were known as "Play" and "Perry"; I was somewhat startled when they insisted that their full name should be on the government's books. Play laboriously spelled out *P-L-A-C-E-N-T-A* and Perry with the same precision spelled her name *P-E-R-I-N-E-U-M*. Some waggish student in a spirit of mischief, no doubt,

fastened these anatomic names onto these young people. Ignorance is bliss—they seemed very proud of their titles.

All day long a string of savages dressed in their store clothes came to Bahada for something new. But to me, with the combined stench of clams, fish, and smoke, mixed with other indescribable odors, it seemed I had fully earned the fee the government paid me.

My notes recall that the old Indians were free from caries, unless we count attrition as a decay. The wear was to the gum-line in all the old, and in some a few teeth were missing, but in the great majority no decay was discovered. Not so with the young people. They without exception had caries, large cavities in all manner of unexpected places. What is known as "white decay" (that known to be rapidly advancing) was common. Chestoka, a young chief, made a significant remark as to the cause of such extensive destruction: "It can't be the climate or the water, so it must be the eating." The result of my report was to send back to the wigwams, spuds, and fish the entire bunch that had been pampered by the government. While this experiment was not entirely satisfactory, the government had induced the Indians to discontinue the flattening the heads of their young. While flat heads are very common among the older of the Siwash, we seldom see any among the younger members of the tribe. I am impressed with the failure of governmental experiment and fancy that no further experiments will be undertaken to improve the teeth of any race or people, except by experts. I believe the time will come when a cabinet member will have charge of the development of the United States soldier. Our government demands physical perfection for fighting men, but absolutely refuses to superintend their development. With poultry and cows it is different.

A film of the thirty days of potlatch and cloquallies, weddings and boat-races would be worth a sack full of money, not only to white people, but to the Indians themselves. When the fun slowed down a bit some buck would get married. It made no difference if he was already a married man. Ellabush, a husky old devil, took himself a new squaw. In the crowd that watched the celebration was the old wife grinning as merrily as the rest. The dramatic feature of the climax of the courting which gave him the right to wed was to negotiate a thrilling rescue of the bride. For this she was pushed out over a huge roller in a small canoe and without a paddle. Certainly as dangerous a place as possible and only to be attempted by an expert surfman. The groom was to swim out and rescue the girl from sure death from the surf. Ellabush, in a wonderful exhibition of swimming, reached the canoe and saved the girl in true movie style, and with her marched up the beach between two lines of onlookers, each of whom was armed with a sprig of evergreen with which they brushed the couple as a favorable comment, not only of the rescue, but of the joy the wedding suggested.

The evening shows put on by these Indians in the big Potlatch house is a memory I cherish. Their great stunt is to dress to represent some animal or bird—the Bear, the Skunk, the Eagle, the Elk, and, what was strange, the Alligator. I questioned the men about him. It seems to prove the Asiatic origin for the Siwash. The Asiatic origin was also corroborated by the char-

acter of the teeth which were extracted for them. The roots and crowns resembled those of the Chinese and Japanese.

While it is impossible to give a detailed account of all that happened during my stay, I cannot leave out the story of the Community or the Potlatch houses. These were built before the advent of the white man. Some of the planks are six or seven inches thick and 110 feet long and seven feet wide, and form one side of the house. When we think that these planks were cut from a solid tree with a hand chisel (the marks of the hand chisel can still be seen) we can hardly estimate the labor and time expended upon such a house. The uprights that hold the roof-logs are also five feet thick. A single log reaches the entire length to form the roof center. How these primitive people handled logs of such proportions has long been a mystery.

An instance is recorded of their belief in the supernatural. A young Indian, "Billy Smith," had been sick for a long time and one fine morning he found himself buried Indian fashion, which consists of a little sand covering. He stretched himself and found himself all right, so he kicked off the sand cover and started down to the bay village. He met some of his friends; their actions were strange. He couldn't think for a long time why they acted so. He finally "tumbled" that they thought that he was dead and his ghost was walking about. He figured he had a distinct advantage and helped on the belief. He found that no one would refuse him anything, no matter what. And, like a sport, he took advantage of the situation. Anything he wanted was his for the taking. He was never molested. His person was actually sacred. Thus he lived for two years; then, from too much indulgence, he finally died. This time he was not left to wander. Over his body they built a substantial log house completely solid. Over the roof was placed long ropes of whale skin; crossed and pinned down at each corner. Twenty of such skin ropes were used. Then sods five feet thick finished the mound at least twenty feet high; that is Hi-u Skookum house.

The influence of the white man on these Indians has not been conducive to physical improvement. No one realizes this as well as the Siwash himself, and they hold in contempt the efforts of the meddlers.

Those old fellows, Ellabush, Light-house-Jim, Carboli and Chief Peter, and a dozen others whose names escape me, were splendid specimens of a manhood which cannot even be approached by the younger set.

These wild men developed themselves to be marvels of strength and physical beauty, with endurance that no white man can ever hope to gain. The perfect development of the teeth and jaws was destroyed in one generation by a change of food and environment. When we study the unnatural food used today we should not be surprised to see maldevelopments. The surprising thing is that we find any child that approaches the normal of growth and function.

I hope at some future time the government will have a commission to study what is proper for the physical development of children. When that is done we will have better men and women, and the children will be recognized as being as important as the pigs and chickens. Then we will not see the unfortunate experiment I have described.

ELECTIVE LOCALIZATION OF STREPTOCOCCI*

By Russell L. Haden, M.D., Kansas City, Mo.

IT HAS long been known that certain bacteria produce characteristically specific pathologic and clinical types of disease. Thus the typhoid bacillus involves especially the lymphatic tissues of the lower ileum, the meningococcus, the meninges, and the pneumococcus, the lung. Rosenow[1] observed ten years ago that the organisms concerned in chronic infection, principally streptococci, likewise tend to have a most striking affinity for the organs or tissue from which they are isolated. He has thus demonstrated that streptococci freshly isolated from infected tissues and from foci of infection in patients suffering from rheumatic fever,[2] ulcer of the stomach,[3] myositis,[4] endocarditis,[5] epidemic parotitis,[6] and numerous other diseases tend to reproduce in animals the lesion from which the patient suffers.

The recent work of the Dicks and of Dochez on scarlet fever[7] and Birkhaug[8] on erysipelas shows definitely that these diseases are due to specific organisms in the hemolytic streptococcus group. Such facts are very strong evidence for the truth of Rosenow's theory of selective affinity. Likewise clinicians are impressed with certain clinical observations which can be explained only on the basis of a specific tendency to localization of the bacteria causing chronic disease. Meisser,[9] Hardt,[10] Bargen,[11] Nakamura,[12] Moench,[13] and others working with Rosenow have been successful in demonstrating the elective localizing property of streptococci. The greater number of workers elsewhere have, however, been unable to verify his findings.

It seems most probable that failures to demonstrate elective localization are due largely to a disregard of certain fundamental and necessary technical details. It is vitally necessary in culturing the bacteria previous to inoculation that the conditions under which the organism was growing in the body be provided in the culture tube. This requires primarily a gradient oxygen tension, but also the use of media favorable for the growth of the organisms. It is very important likewise, that the least possible time elapse between the removal of the infected material from the body and the injection of the culture. By careful attention to such technical details I have been able to demonstrate a remarkable elective affinity in cases of eye infection,[14] kidney disease,[15] peptic ulcer,[16] onychia[17] and other conditions.

I have made all cultures in glucose brain broth and glucose brain agar. These media are almost specific for the nonhemolytic streptococcus and provide every degree of oxygen tension from complete anaerobiosis to full atmospheric tension. I have described fully elsewhere the method of prepara-

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tion of media and the technic used in making the cultures.[14] Rabbits were injected intravenously with the original broth cultures as soon as good growth was apparent. This was usually less than twenty-four hours after the culture material was obtained. Each animal was given 5 c.c. of the broth culture. A complete autopsy was done on each animal. A certain percentage of animals died from the inoculation. The others were killed in three to six days

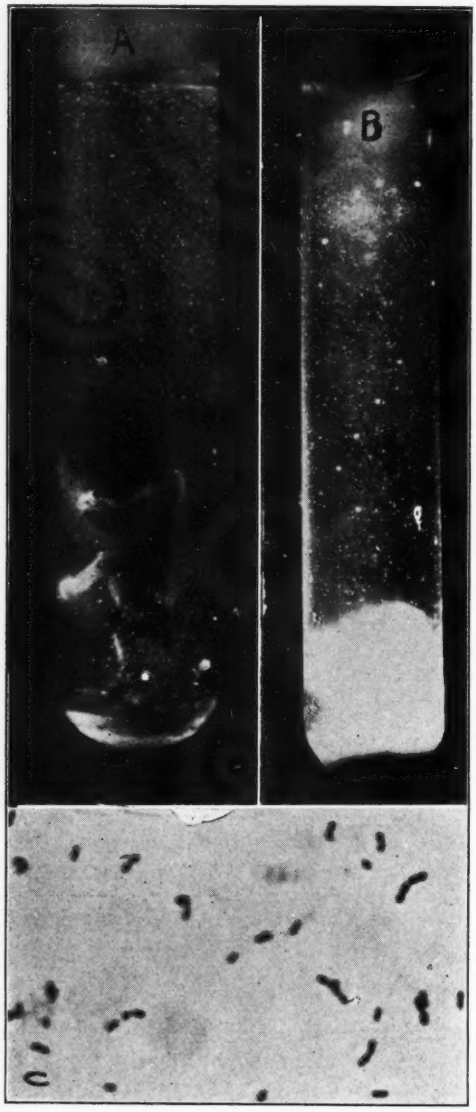


Fig. 1.—*A*. Culture in deep tube of glucose brain agar of a periapical infection. Note the uniform growth throughout the tube. *B*. A culture similarly made which will not grow near the top of the tube in the aerobic zone. *C*. Typical short chain streptococcus from a periapical infection.

after the intravenous injection. No lesion was considered present unless plainly visible to the naked eye of at least two observers. Microscopic sections were made from many of the tissues.

In Fig. 1 are shown two cultures from periapical dental infections in deep tubes of glucose brain broth agar. The organisms have grown uniformly

throughout all levels of the tube in one (Fig. 1-*A*). In the other (Fig. 1-*B*) the colonies are large on the bottom of the tube, but gradually become smaller as the oxygen tension increases nearer the top. In the upper level only an occasional colony is seen. The majority of the agar cultures from periapical dental infections show either little or no growth at the top of the tube. The nonhemolytic streptococcus (Fig. 1-*C*) is the predominant organism. In a recent summary of 1,091 positive broth cultures from dental infections 999 con-

TABLE I

INCIDENCE OF LESIONS IN ANIMALS INJECTED INTRAVENOUSLY WITH BACTERIA FROM DENTAL INFECTION

Number of animals	Number of patients	Percentage of animals showing lesions in							
		Joint	Kidney	Muscle	Endo-cardium	Myo-cardium	Brain	Eye	Stomach and duodenum
1250	415	58	32	22	18	10	4	14	14

TABLE II

LOCALIZATION OF BACTERIA FROM DENTAL FOCI OF INFECTION

Cultures from patients with	Number of animals	Number of patients	Percentage of animals showing lesions in							
			Joint	Kidney	Muscle	Endo-cardium	Myo-cardium	Brain	Eye	Stomach and duodenum
Kidney infection	48	10	73	85	25	4	4	2	6	6
Heart or vascular disease	42	10	71	33	24	62	36	2	5	14
Eye infection	110	26	61	37	20	15	7	10	68	5
Peptic ulcer	85	23	46	22	28	13	13	2	7	53
No known kidney, heart, eye, or gastric disease	965	346	58	29	21	18	9	4	9	12

tained the streptococcus, usually in pure culture. Hemolytic streptococci are seldom encountered in periapical dental infections.

The incidence of lesions in all animals injected is shown in Table I. Only the major lesions are recorded here. Involvement of almost all tissues of the body have been observed, at different times. The most interesting thing about the table is that the incidence of lesions in animals after the intravenous injection of bacteria from chronic foci agrees quite closely with the lesions due to chronic focal infection observed clinically in man. Thus arthritis, the most common lesion in animals, is certainly the most common systemic manifestation of focal infection.

In Table II is shown the incidence of involvement of the different organs of the rabbit after inoculation with bacteria recovered from foci in different clinical groups of patients. The animals injected with bacteria from patients suffering from kidney disease had involvement of the kidneys in 85 per cent, while only 22 to 37 per cent of the other groups showed kidney disease. Sixty-six per cent of the rabbits injected with the cultures from patients having clinical evidence of heart or vascular disease showed lesions in the endocardium, and 36 per cent in the myocardium. Of the other groups, there was involvement of the endocardium in 4 to 15 per cent, and of the myocardium in 4 to 13 per cent. Of 110 rabbits injected with cultures from patients suffering from metastatic eye infection, 68 per cent showed infection of the eye. The incidence of the other groups varied from 5 to 7 per cent. In the rabbits injected with bacteria recovered from foci in patients having peptic ulcer, 53 per cent showed gross lesions in the stomach or duodenum or both. The incidence of similar lesions in the control groups varied from 5 to 14 per cent. It will be noted that often more than one organ is involved. It is likewise exceedingly common to find in patients more than one systemic disease of focal origin.

The results in these four groups of cases offer striking evidence of the truth of the theory of elective localization. The cultures have been made in a uniform manner. Each rabbit has been injected intravenously with 5 c.c. of broth culture, and every animal has been subjected to a routine autopsy. The study is at least a fair, comparative one of the disease-producing power of bacteria isolated from foci in patients suffering from different types of metastatic disease of focal origin.

Various explanations are offered for the tendency to specific localization. The extent of clumping of the organism, the nature of the blood supply, the food supply, and local tissue resistance must all be factors in determining the site of localization. The most important factor, however, is some peculiar property, probably of a chemical nature, inherent to the organism. The localizing tendency of bacteria in certain foci varies from time to time. Its development is probably dependent upon local conditions at the site of the focus and also upon properties peculiar to the tissues and the fluids of the host. Rosenow has emphasized[18] that "the focus is of importance not only as affording the entrance way for bacteria, but also as a place where varying affinities may be acquired."

The characteristic findings of elective localization are best illustrated by the few case reports.

CASE REPORTS

CASE I.—*History:* A middle-aged physician had had recurrent attacks characterized by symptoms of the same type over a period of years. The symptoms were those of myositis, a low-grade arthritis, irritability of the bladder, and hyperchlorhydria. An attack was nearly always coincidental with the development of active foci of infection. Marked relief from the symptoms followed the removal of the active foci containing the organism with which the symptoms were reproduced in animals.

When first seen in December, 1923, the patient had experienced again gradually increasing pains around the small joints, recurring attacks of myositis and lumbago, stiffness of the muscles in the morning, and lack of endurance. On account of these symptoms and the absence of apparent foci elsewhere one of two devitalized teeth had been extracted. A pure culture of a streptococcus which had a marked affinity for the joints and muscle was obtained.



Fig. 2.—Massive hemorrhages in shoulder muscles of rabbit injected with culture of teeth of patient (Case 1) suffering from myositis.

A new set of dental radiographs made just after this tooth was extracted revealed the presence of one of the gutta-percha points over the apex of the tooth which had recently been extracted. The right upper cuspid was also pulpless but showed no radiographic evidence of infection.

The cuspid was extracted. At the same time the area of the upper right first and second molars, which was suspected of infection in the radiograph was opened and curetted. The bone was quite soft. The tooth removed from this area seven years before had had a draining fistula from it for a long time before extraction. The cultures from the curetted bone and the apex of the cuspid tooth showed in deep tubes of glucose brain agar a profuse growth of short-chain streptococci.

Animal Inoculation.—Two rabbits were injected with the broth culture from the cuspid and killed two days later. One showed slight involvement of the joints and kidney medulla. There were also many hemorrhages in the lumbar region and a few in muscles elsewhere. The other rabbit also showed hemorrhages in the lumbar muscles and purulent fluid in the joints. Two rabbits were injected with the broth culture of the streptococcus isolated from the infected residual area. One at autopsy showed many hemorrhages in the muscles throughout the body (Fig. 2) and slight involvement of joint and kidney medulla. The lesions in the other rabbit were similar except that there were no kidney lesions.

Two rabbits were injected with a broth culture of the patient's saliva made at the time the teeth were extracted. At autopsy no lesions of any kind were found. Following the removal of these foci the patient was markedly improved. Several months later another tooth supposedly vital was found to be infected. After this had been extracted the patient was entirely relieved of all symptoms.

CASE II.—*History:* M. C. S., a dentist, aged thirty-two years, had had typical symptoms of a duodenal ulcer in 1917. Gastric analysis at this time showed a hyperacidity and roentgenograms a deformity of the duodenal bulb. Following this initial attack, there were successive similar attacks at intervals of from six to twelve months, each lasting several weeks. In February, 1924, he had a large hemorrhage. The roentgenographic examination was repeated in 1921 and 1924, the typical findings of duodenal ulcer being apparent each time.

The tonsils had been removed in 1917. He had had attacks of tonsillitis. There had been no other serious illness.

Animal Inoculation.—When seen in May, 1924, another attack was just beginning. The only positive finding on examination was infected adenoid tissue in the nasopharynx and

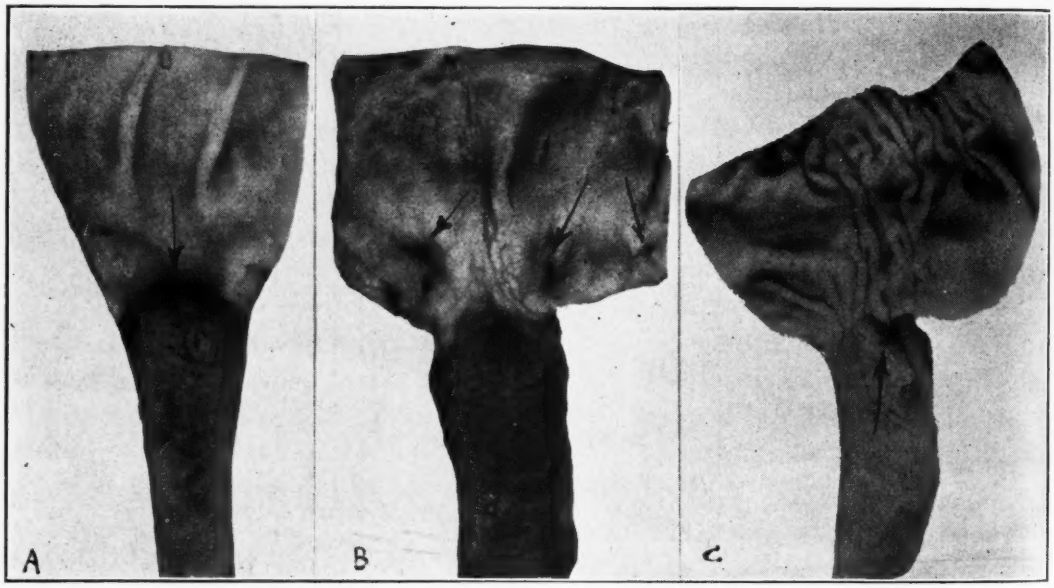


Fig. 3.—*A.* Massive hemorrhage in a duodenal bulb of rabbit inoculated with the culture from the tonsils of a patient (Case 2) suffering from duodenal ulcer.

B. Ulcers near pylorus of rabbit injected with the cultures of tonsils after extirpation. There are also numerous hemorrhages in the duodenum.

C. Multiple hemorrhages in duodenum of rabbit from an infected molar of the same patient.

some remaining tonsil tissue. Pus was expressed from the tonsil tissue. Two rabbits were injected with the broth culture and killed twenty-four hours later. Both animals showed many hemorrhages in the duodenal bulb (Fig. 3 *A*). The tonsil and adenoid tissues were removed the following week. One rabbit was injected with the culture of the excised tissue. At necropsy there were numerous hemorrhages and necrosis in the pyloric end of the stomach (Fig. 3 *B*).

Following the operation there was a marked improvement in the gastric symptoms. Later he again developed gastric symptoms when a partially erupted third molar became infected. The injection of the broth culture of the streptococcus from the infected area again produced duodenal lesions in animals (Fig. 3 *C*).

CASE III.—*History:* S. E. O., a woman, aged forty years, in February, 1924, had acute arthritis followed by acute nephritis. On a stringent milk diet she improved and the marked edema which she had had, almost disappeared. When seen six months after the onset there

was still a large amount of albumin, casts and a few red blood cells in the urine. Some edema of the feet persisted.

The tonsils had been removed cleanly some years before, and three teeth had been removed during the present illness. There were three nonvital teeth remaining, two of which showed large areas of apical rarefaction (Fig. 4 *A*). These were removed. All showed on culture a profuse growth of streptococci.

Animal Inoculation.—Two rabbits were injected with the mixed cultures and killed three days later. The kidneys of both animals were swollen and gray in color. The cortex was studded with pin-point hemorrhages (Fig. 4 *B*). There was also joint involvement, and necrosis of the heart muscles in both animals. One also had lesions in the eye, muscle and stomach.

The albuminuria manifested by the patient disappeared over a two-month period following the extraction of the teeth. The patient is now perfectly well.

CASE IV.—*History:* Mrs. F. T., a housewife, aged forty-three years, had had typhoid fever in 1914 and rheumatism during the preceding year. Her eye trouble began in 1912, with a severe attack of iritis with almost complete loss of vision in the left eye. A second

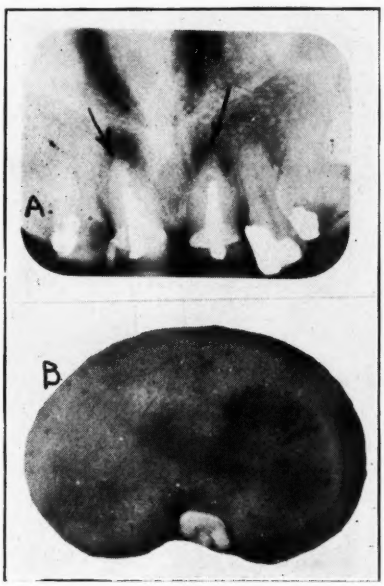


Fig. 4.—*A*. Infected upper central incisor teeth of patient (Case 3) suffering from chronic parenchymatous nephritis.
B. Kidney of rabbit injected with streptococci from teeth shown above. Note the multiple hemorrhages in the cortex.

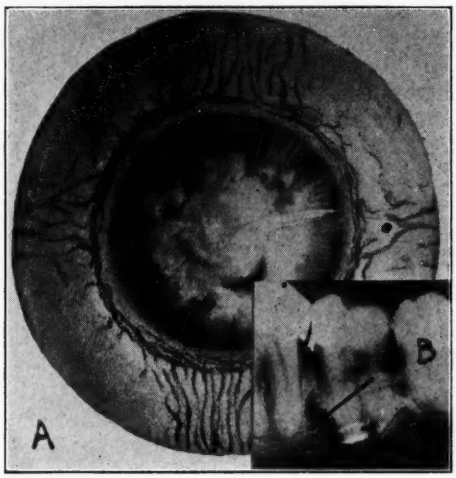


Fig. 5.—*A*. Pericorneal injection and exudate in anterior chamber of eye of rabbit inoculated with the culture from an infected tooth (Fig. 5-*B*) of a patient (Case 4) suffering from iritis.

attack occurred in 1916. She had no further trouble until December, 1922, when iritis again occurred in the right eye, followed by another attack in January, 1923. The patient said that a large filling had been placed in the right lower first molar in 1912. The tooth became very painful. The filling was removed to "let the gas out" and replaced. The first attack of iritis developed soon after the tooth trouble. An examination of the left eye showed no light perception, posterior synechiae without active infection. The vision in the right eye was 20/20. There were posterior synechiae but no inflammation.

The patient was undernourished. The tonsils were small. The general physical examination was otherwise negative. Blood count revealed: red cells, 4,300,000; white cells, 8,700 and a normal differential count. All the upper teeth had been extracted. A roentgenogram showed no apparent bone infection in the upper jaw. The right lower first molar had a large silver filling, was tipped forward, and had a pocket around it (Fig. 5 *B*).

The tooth responded, however, to tests for vitality. This tooth was extracted. Upon opening the pulp chamber under sterile precautions, it was found that the pulp chamber had

been encroached upon by secondary dentine formation. The nerve was injected and edematous and showed a pure culture of Streptococcus mitis. The same organism was obtained in the culture of the root tips.

Animal Inoculation.—Two rabbits were inoculated with the mixed cultures from the pulp and root tip on February 2, 1923. One animal developed an extreme pericorneal injection which was less marked the following day. On February 7, the circumcorneal injection had returned in the right eye. There were multiple hemorrhages in the iris and cloudy fluid

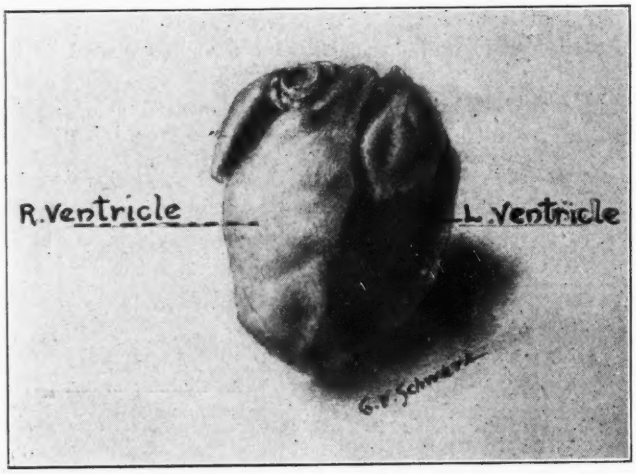


Fig. 6.—Massive necrosis of almost entire right ventricle of rabbit injected with a culture from the infected teeth of patient suffering from myocardial disease (Case 5).



Fig. 7.—Large ulcer in stomach of rabbit injected intravenously wtih the cultures from the tonsils of a patient suffering from peptic ulcer (Case 6).

in the anterior chamber (Fig. 5 *A*). Necropsy revealed also abscesses of the kidneys, white streaks in the muscles and a purulent arthritis. The other rabbit showed only cloudy fluid in the joints.

Case V.—*History:* L. B. N., a carpenter, aged forty-two years, complained of recurrent attacks of pain over the heart. The attacks had begun eight months previously, were always brought on by exertion and were relieved by rest. During one attack the left arm felt numb. He had always been well before the present illness.

Upon examination numerous extrasystoles were noted. The blood pressure was 100/75.

There was no anemia. The blood Wassermann was negative. The urine showed no albumin, sugar, or casts. There were numerous pulpless teeth. The tonsils were removed and the pulpless teeth extracted. After the extraction of the teeth the patient felt so much better he wished to return to work. Two weeks later he began to have dyspnea which increased in severity. He complained of a feeling of pressure in the chest and developed a pericardial friction rub. Signs of myocardial insufficiency soon developed, followed by death about one year after the onset of symptoms.

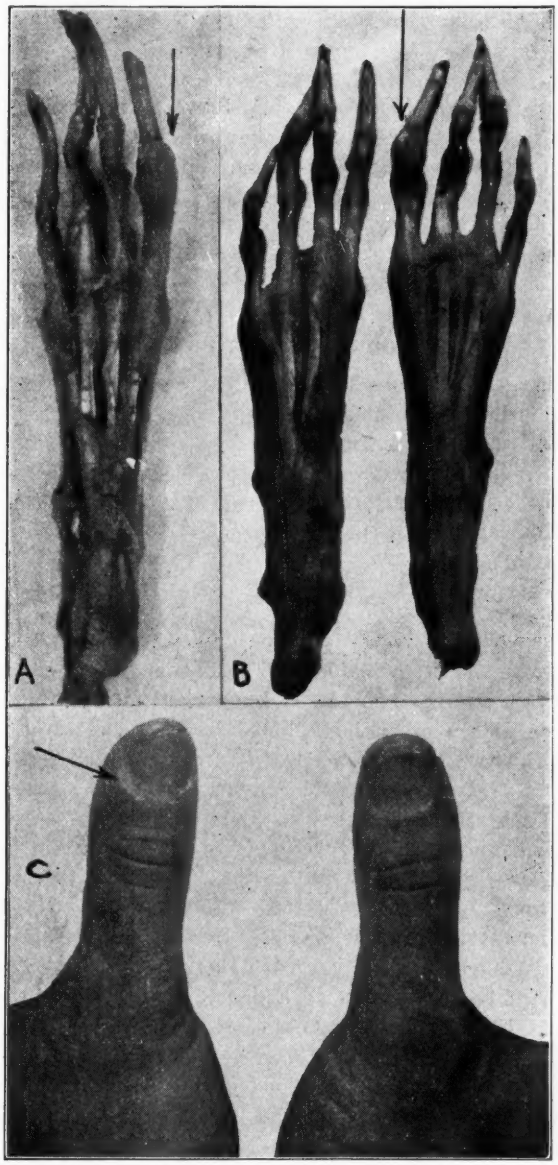


Fig. 8.—*A.* Onychia in rabbit produced by injection of mixed cultures from patient's teeth. *B.* Onychia in rabbit produced by the injection of cultures from area of residual infection in bone. *C.* Photograph of thumbs of patient (Case 7) with onychia. Note the swelling around nail on left.

Animal Inoculation.—Two rabbits injected with the broth culture from the tonsils showed no lesions of any kind. Three x-ray positive teeth, the left lower first and second bicuspids, and first molar, were first extracted. All showed a profuse growth of streptococci. Two rabbits were injected and killed three days after inoculation. One showed only an arthritis with a pyelonephritis. The other showed a marked necrosis of the myocardium

involving almost the entire right ventricle (Fig. 6). A slight joint involvement was the only other lesion present.

One week later four more teeth were extracted. The left upper first bicuspid and lateral incisor were x-ray positive and showed a profuse growth of streptococci upon culture. The left upper was negative in the radiograph and showed also a profuse growth of streptococci on culture. The left upper cuspid showed only a few colonies in the agar tube and was negative in the radiograph. Two rabbits were inoculated with the mixed cultures. One showed at autopsy slight joint lesions and yellow plaques in the arch of the aorta. The other showed lesions in the joints and muscles, marked necrosis of the heart muscle, and several vegetations on the mitral valve.

CASE VI.—*History:* E. L. W., a man aged twenty-nine years, a secretary, had had copious gastric hemorrhage July 29, 1922. For six months preceding this attack he had suffered almost constantly with heartburn and eructation of gas. The symptoms were relieved by food and soda. Roentgenographic examination at the time of the hemorrhage showed a duodenal ulcer.

The symptoms were only partly alleviated by rest, diet and alkalis. He continued to have periodic attacks of "indigestion." He had had several teeth treated, one of which was abscessed, shortly before the gastric hemorrhage. He had never had a serious illness previously, and had had no attacks of tonsillitis since childhood.

Animal Inoculation.—When seen March 1, 1924, the physical examination was negative except for large red tonsils, from which frank pus could be expressed. Cultures were made from the pus expressed in glucose brain broth. Two rabbits were injected with 5 c.c. each of the broth culture. When necropsy was done forty-eight hours after injection, one animal was found to have a large ulcer of the pyloric end of the stomach (Fig. 7), with no other lesions. The other rabbit showed several small hemorrhages in the stomach, and early lesions in the medulla of the kidney.

The tonsils were removed. The patient had one slight attack of stomach trouble three weeks after tonsillectomy. When seen three months later he was entirely free of symptoms.

CASE VII.—*History:* C. S., a maid, aged thirty-one years, complained of nervousness and trouble with the finger nails. She had had the usual diseases of childhood. Four years before she had had an attack of iritis, followed by a second attack a year later. Three years before she had had two attacks of "kidney trouble." At this time she was confined to her bed and suffered from weakness and frequent urination.

The patient said that there had been swelling, redness and tenderness around the nail of the right middle finger at intervals for three years. Four weeks before an attempt was made to extract the lower right bicuspid tooth. Soon after this the right thumb became red, swollen and painful around the nail.

Upon examination, the patient was found to be in a good state of nutrition. The iris showed remains of an old iritis. Free pus could be expressed from the tonsils. The heart sounds were distant with the suggestion of a diastolic whiff down the left sternal margin. The blood pressure was 110/65. There was marked swelling, redness and tenderness around the nail of the thumb and middle finger of the right hand (Fig. 8 *C*).

A blood count showed 4,400,000 red blood cells and 8,300 white cells. A differential count revealed: polymorphonuclear neutrophiles, 66.6 per cent; eosinophiles, 0.2 per cent; basophiles, 1 per cent; lymphocytes, 28.4 per cent, and large mononuclears, 3.8 per cent. The urine was negative for albumin and sugar and showed no pus or casts. The Wassermann test was negative.

A radiograph of the teeth revealed six nonvital teeth, only one of which showed an area of bone absorption around the apex. The root of the lower right bicuspid had been broken off and showed a large area of bone destruction around it.

The broken off root and all the nonvital teeth were extracted. One was sterile on culture, four showed Streptococcus fecalis and one Streptococcus salivarius.

Animal Inoculation.—Two rabbits were injected intravenously from each of the cultures obtained from the root ends. One of the rabbits injected with the culture from the

upper right cuspid showed marked swelling around the nail of two toes (Fig. 8 *B*). One injected with the streptococcus grown from the upper left bicuspid showed a similar involvement of the first toe of the right hind foot. The organism injected was recovered from the nail root of the second toe of the right fore foot in pure culture. One rabbit injected with the organism recovered from the root of the right lower bicuspid had injection, hemorrhage, and edema around the nail root of the toes of the right fore foot. One toe of the left hind foot and one of the right hind foot showed the same picture. One of the rabbits injected with a culture from the curetting of the socket of the same tooth showed hemorrhage and swelling around several toes.

Altogether, sixteen rabbits were injected with cultures from eight different areas. Four of the rabbits developed onychia. Two of the four were injected with the culture from the lower right bicuspid. The involvement of the thumb of the patient had followed the breaking off of this tooth in an attempt at extraction.

The nail lesion did not heal completely although there was some improvement. One year after the teeth were extracted some infected areas remaining in the bone were curetted. One of the two rabbits injected with the culture from the area in the upper left side developed marked onychia (Fig. 8 *A*). Following the removal of these residual foci the patient has recovered completely.

SUMMARY

Bacteria from chronic foci, if etiologically related to systemic disease, tend to reproduce in animals the lesion from which the patient suffers.

Successful experimental results depend largely upon the use of culture media providing gradient oxygen tension and the rapid transfer of organisms from patient to the experimental animal.

Four groups of cases are reported in which a striking tendency to elective localization is demonstrated.

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STRUCTURAL CHARACTERISTICS OF THE ALVEOLAR PROCESS*

By Hugh W. MacMillan, D.D.S., M.D., Cincinnati, Ohio

THE continual repetition of the fact that bone is a plastic substance, adapting itself to its environment, strengthening itself under stress, characterized by "increased closeness of spacing of trabeculae" in accordance with engineering principles, and being constantly molded in its external contour and internal architecture, year by year, month by month, or, in fact, day by day, becomes monotonous to the student of bone mechanics and bone regeneration until he hears from the lips of men occupying high positions on teaching faculties and dental clinics and reads from the textbooks and special articles of dental authorities such misstatements of facts, such preconceived and prejudiced opinions, such sweeping generalizations concerning a structure the characteristics of which should be as familiar to the dentist as the tooth itself. To find descriptions of the alveolar process requires considerable research. Being of little interest to the medical student, it is scarcely mentioned in textbooks of anatomy. A search through dental textbooks reveals, with the notable exception of Noyes, the same result. Unfortunately courses in dental anatomy are confined to the study of that part of the tooth peripheral to the pericementum. The alveolar process does not claim as much attention from the dental student as the uriniferous tubules or the islands of Langerhans.

The alveolar process may be defined as that part of the jaw bones which gives support to the teeth or their artificial substitutes, and is composed of compact and cancellous tissue arranged in its external contour and internal architecture to best meet the stresses transmitted during mastication. It may be further emphasized that the relation of opposing teeth, the length of the cusps, different degrees in the axial angles of the superior and inferior teeth, the influence of the accessory factors concerned in mastication, and all the remaining causes, pathologic or otherwise, which may affect individual bones or the osseous system in general, are as indelibly imprinted on the structure of the alveolar process as environment influences the head of the femur.

The limiting boundaries of the alveolar process have never been defined. The roentgen ray reveals a similar density throughout the compact bone in a cross section. In that part of the process which is subjected to heavy stress, its resistance to the ray would hardly class it as "soft, spongy bone." Over the cuspid eminences, where the bone over the middle third is often thin and even absent, owing to the mechanical requirements of that particular occlusion, there is no necessity for medullary spaces, as the thin bone is readily nourished by the periosteal vessels. However, the thicker bone at the gingival margin of the cuspid contains medullary spaces and is beautifully nourished and adapted for its particular requirements. Under normal conditions, the

*Read before the Twenty-fifth Annual Meeting of the American Society of Orthodontists held at Atlanta, Ga., April 14-17, 1925.

character and arrangement of the bone around the rim of the alveolus is a beautiful illustration of strength and economy, with perfect provision for nourishment. From its physical appearance, its function and even its development, the alveolar process needs no special nomenclature or special pathology. It is the most beautiful illustration that bone is a "living plastic material which is molded by its position, stresses and environment."

Several pages might be written upon the physical characteristics of the alveolar process surrounding each tooth—how it varies with the length of the cusps, with the angles of the inclined planes, with the extent of the overbite, with the mesiodistal axial angles, with the occlusion, with the loss of

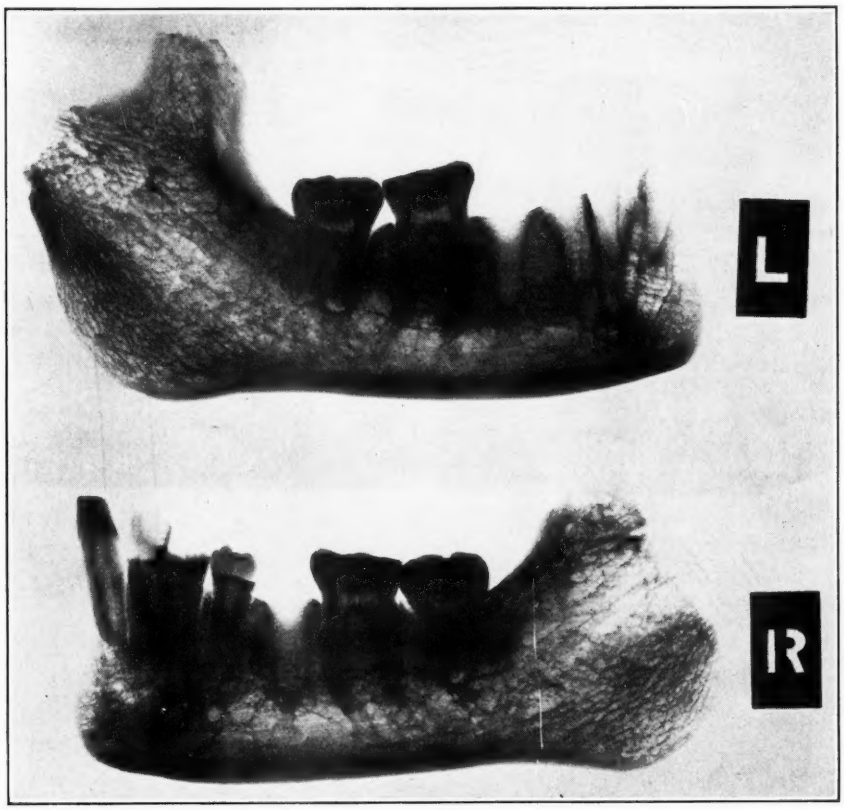


Fig. 1.—Lateral views of a mandible excavated from the desert at Ancon, Peru. Note worn occlusal surface of the first molar and absence of third molar. In conformance with the law of bending stress, the body of the mandible in the second premolar and molar regions is hollow, the bone forming the outer and inner alveolar plates being arranged "with its mass at the greatest distance from the neutral axis."

teeth, with unusual masticatory stress, with disuse atrophy, and again, how all these factors are related to the conformation of the glenoid fossae and condyles. As a matter of fact most of these changes have been mentioned but almost never demonstrated. Instead of further generalizing on the subject, a study of the lantern slides will disclose the fact that in no place elsewhere in the body, not excepting the neck of the femur, is bone mechanics more beautifully illustrated. While this study has been instituted primarily to confute that damnable operation of radical alveolectomy, its direct application to orthodontia will be apparent.

In making labiolingual sections of skulls and replacing them in plaster

casts made before sectioning in order to preserve their correct axial relationship, the approach of the axial angle to 90 degrees was surprising. The axial angle may be defined as the measurement on the radiograph of the

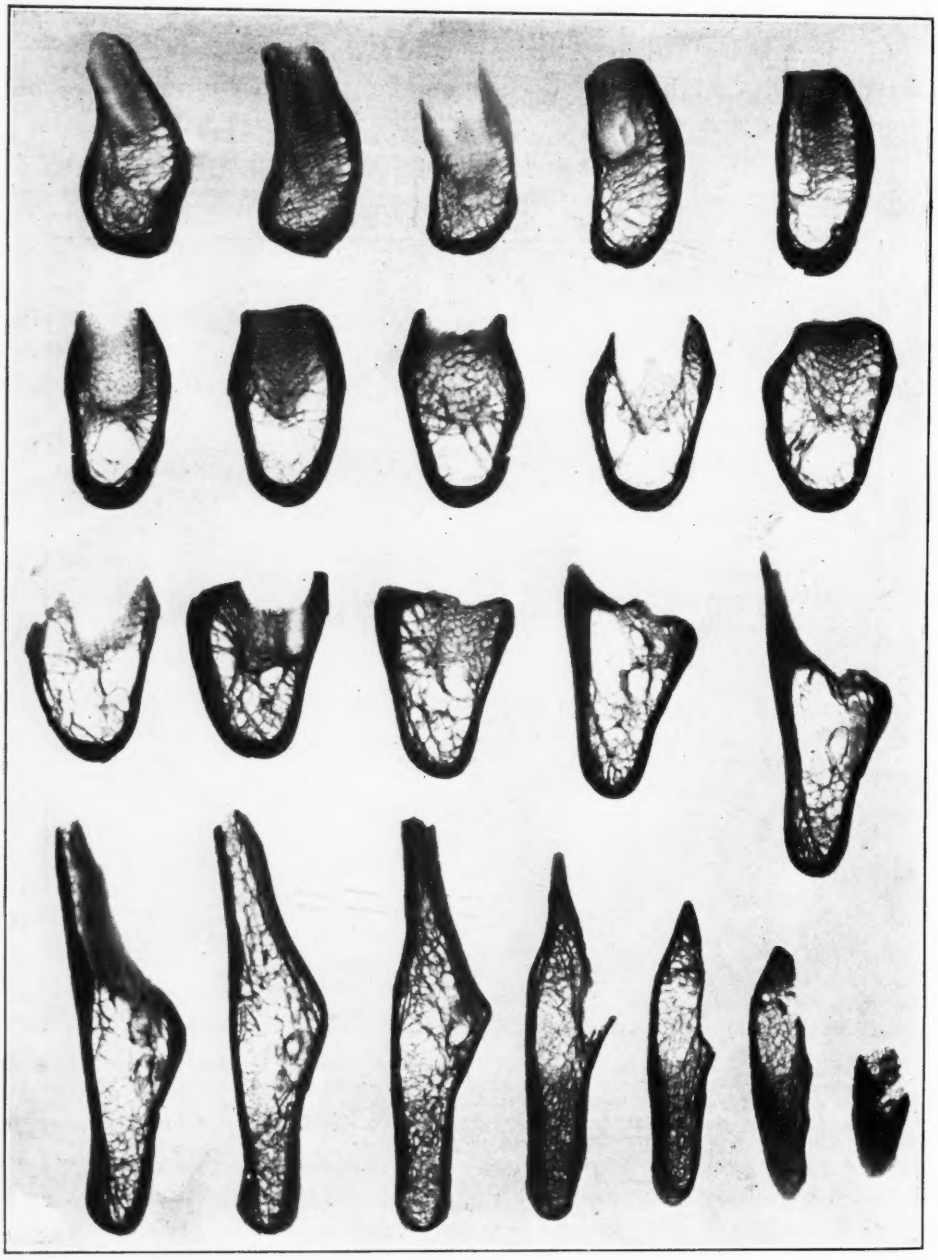


Fig. 2.—A study of the alveolar spongiosa. These cross sections made from a mandible excavated from the desert at Ancon, Peru. The delicate reticulated network was preserved in sawing by first removing the teeth and embedding the mandible in base plate wax. The lateral view before sectioning is shown in Fig. 1, *L*.

amount of opening between two lines converging to a point which are drawn through the long axes of opposing maxillary and mandibular teeth maintained in their correct anatomic relation, the roentgen ray having been directed parallel to their axiomesiodistal planes. The degree of this axial

angle has been a surprising revelation to many dental teachers. It seems to be the general conception among dentists and anthropologists that the upper and lower incisors are nearly vertical. This misconception is vividly stated in the March 28 number of the *Literary Digest* which describes a fossil skull recently found in South Africa and believed to be that of an anthropoid ape more nearly allied to man than any hitherto known.

"The incisors as a group are irregular in size, tend to overlap one another, and are almost vertical, as in man; they are not symmetrical and well spaced, and do not project forward markedly, as in anthropoids. The maxillary lateral incisors do project forward to some extent, but the lower lateral incisors are not even vertical as in most races of mankind, but are directed slightly backward, as sometimes occurs in man. Owing to these remarkably

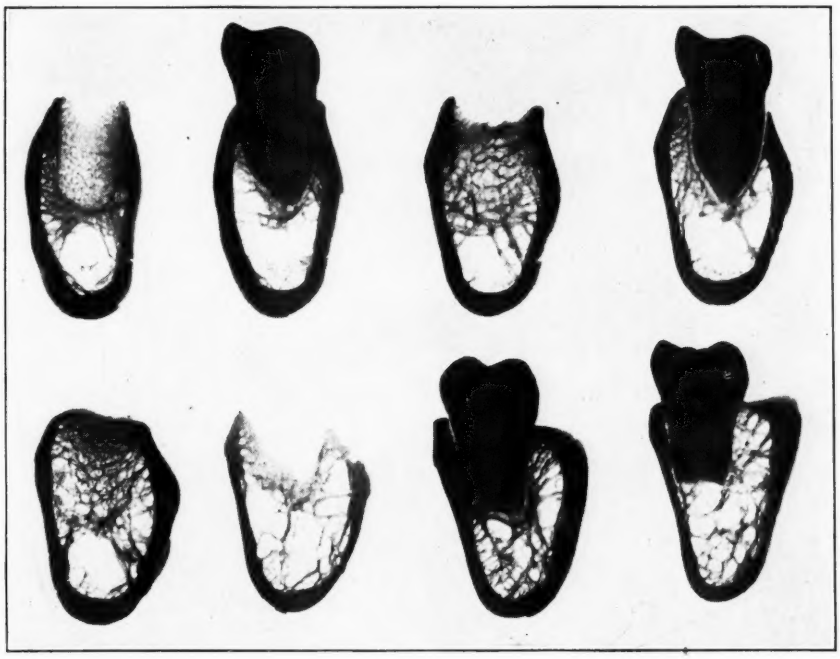


Fig. 3.—A coronal section was made through the crowns of the molar and the halves placed in their respective stations in the sections of the Peruvian mandible. Note the relative thickness of buccal and lingual alveolar plates, also the relative compactness of the spongiosa around the first molar showing wear, and the second molar not yet in occlusion.

human characters, the jaw and the teeth, as a whole, take up a parabolic arrangement comparable only with that presented by mankind among the higher primates."

The determination of the normal axial angle is a problem which should be more closely allied to orthodontia than to any other department of dentistry. Before regulating, a careful study should first be made of the degree of the axial angle and the extent of the overbite to be considered as individually normal for the patient. This may be arrived at somewhat accurately by the study of casts made of the parents and other members of the family which are taken in determining the prognosis and method of treatment. Too many times the anterior teeth are moved to the vertical position which the operator erroneously thinks is correct, and then gradually assume their for-

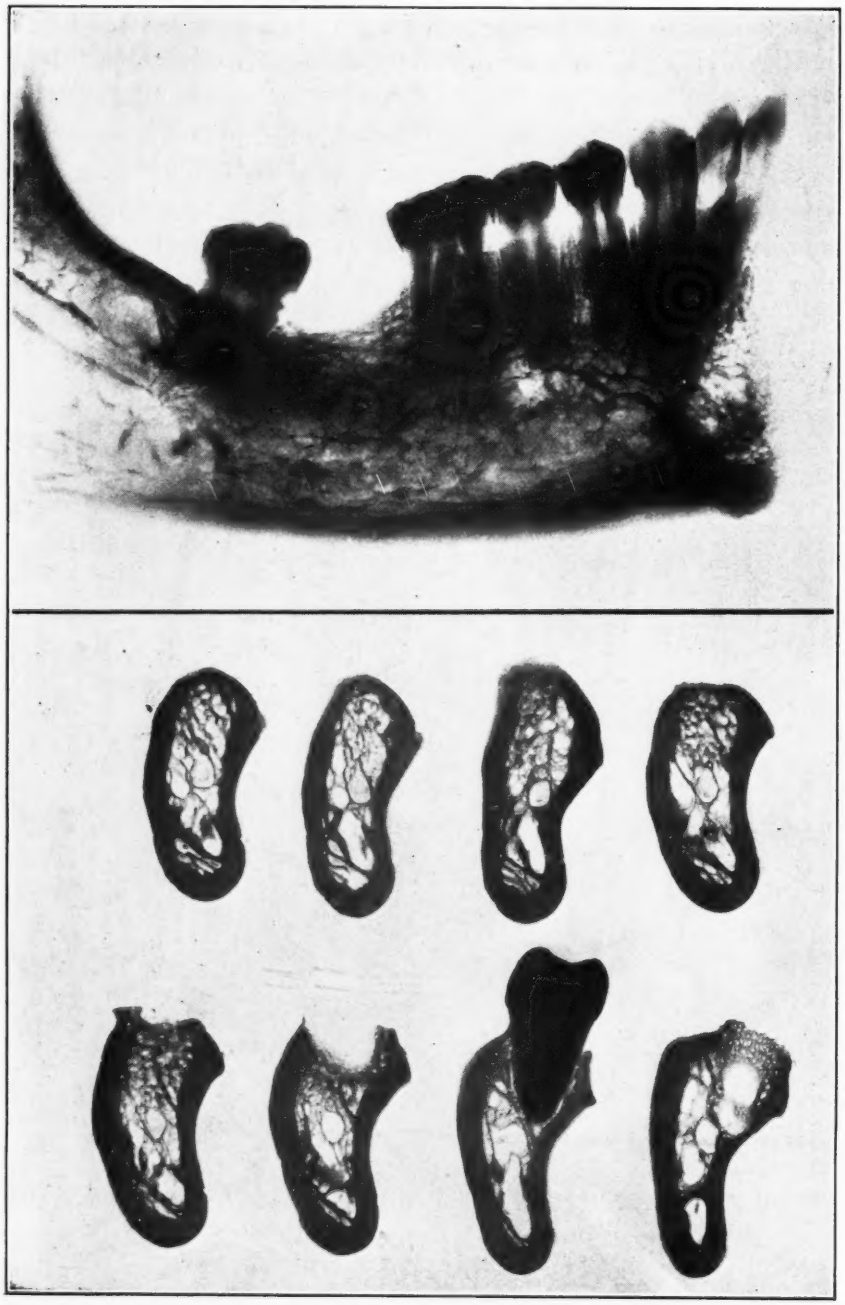


Fig. 4.—In the upper figure note the increased closeness of spacing of the spongiosa and the changes in direction of the supporting trabeculae in that part of the alveolar process just anterior to the molar. This is in accordance with the findings of Koch: "The thickness and closeness of spacing of trabeculae in bone vary directly with the intensity of the stresses transmitted by them," and further, "the most direct manner of transmitting stress is in the direction in which the stress acts."

The lower figures are cross sections of this area. Note that the size of the spaces in the different sections is in direct proportion to the degrees of radiolucency shown in the upper figure. These changes are physiological adaptations of the alveolar process to stimulation coming from a different direction by virtue of the molar being inclined mesioaxially. To term these changes as condensing osteitis is to confuse their origin.

mer position. In several cases observed this has been due to the fact that either the lower anterior teeth have not been tipped out sufficiently to the labial or else they have been moved out bodily in the same plane which they occupied originally. It would seem that the position of lower anterior teeth should be considered much more carefully than the superior teeth in maintaining correct occlusion when once established. Also it seems that many cases of malocclusion might be prevented or at least the treatment simplified by correcting the axiomesiodistal planes of the mandibular teeth, thereby providing the guide for the superior teeth and the lower lip to be molded over.

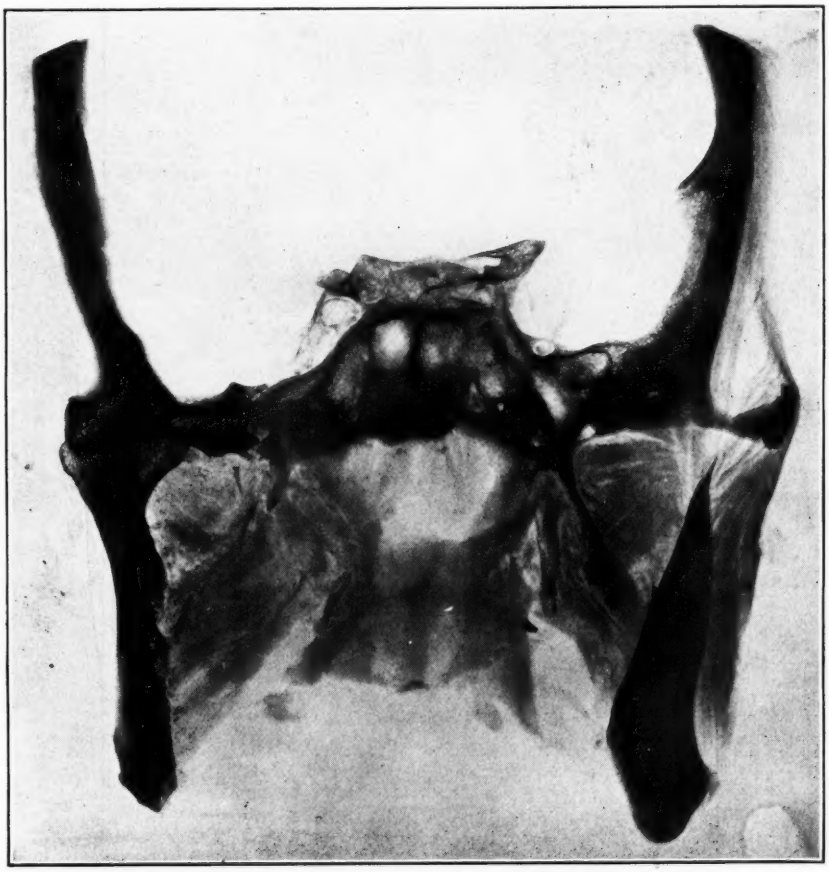


Fig. 5.—The value of the roentgen ray in showing structural details of soft tissues is shown in the above reproduction. Note the diversity in directions of the muscle fibers which graphically depicts the complexity of anatomical mechanism concerned in mastication.

Speaking of the normal axial angle, it would hardly be normal (I use the word here advisedly) for an essayist not to give a definition of normal occlusion. In a short acquaintance with orthodontic literature one finds as many definitions of this term as the authorities he consults. One amusing definition is that recently given by Hellman in the April, 1925, number of the *Dental Cosmos* where he uses the two words he is attempting to define in their definition. According to Hellman: "Normal Occlusion is that form of occlusion in which the typal number (the average plus or minus the standard deviation) of the normally related factors of occlusion are brought into effective juxtaposition."

A simple and all-inclusive definition could be formed by paraphrasing the Standard Dictionary's definition of normal. Normal occlusion is the relation of the maxillary and mandibular teeth according to the standard or rule which is observed or claimed to prevail.

The acceptance of this definition will make it unnecessary for orthodontists to quarrel any longer over definitions, but to better spend their time



Fig. 6.—Compare the value of the actual photograph with the radiographic reproduction of the same specimen.

in some constructive differing on what "is claimed to prevail." In his factors of occlusion Hellman presents 128 points which enter into the normal. As the 129th point, the factor of the axial angle is offered for your discussion. The degree of the normal axial angle which is "according to the standard or rule observed or claimed to prevail," would assist materially in combating, for example, the great mistake of some orthodontists in attempting

to create Apollo-like profiles from profiles destined through centuries of pure breeding to remain characteristically or by inheritance, Hebraic.

In conclusion before presenting the lantern slides, I would like to acknowledge my debt to the specialty of orthodontia, particularly to the authors of the standard textbooks, and more particularly to the published writings and personal conversations with Drs. Lischer, Noyes, and Dewey. As a mat-



Fig. 6.

ter of fact, the work about to be presented was originally inspired a few years ago by a constructive criticism by Dewey. While the whole presentation may be a beautiful example of "carrying coals to Newcastle," it may prove interesting to see original, unretouched, depictions illustrating the fact that the alveolar process differs only in name from the remaining osseous system.

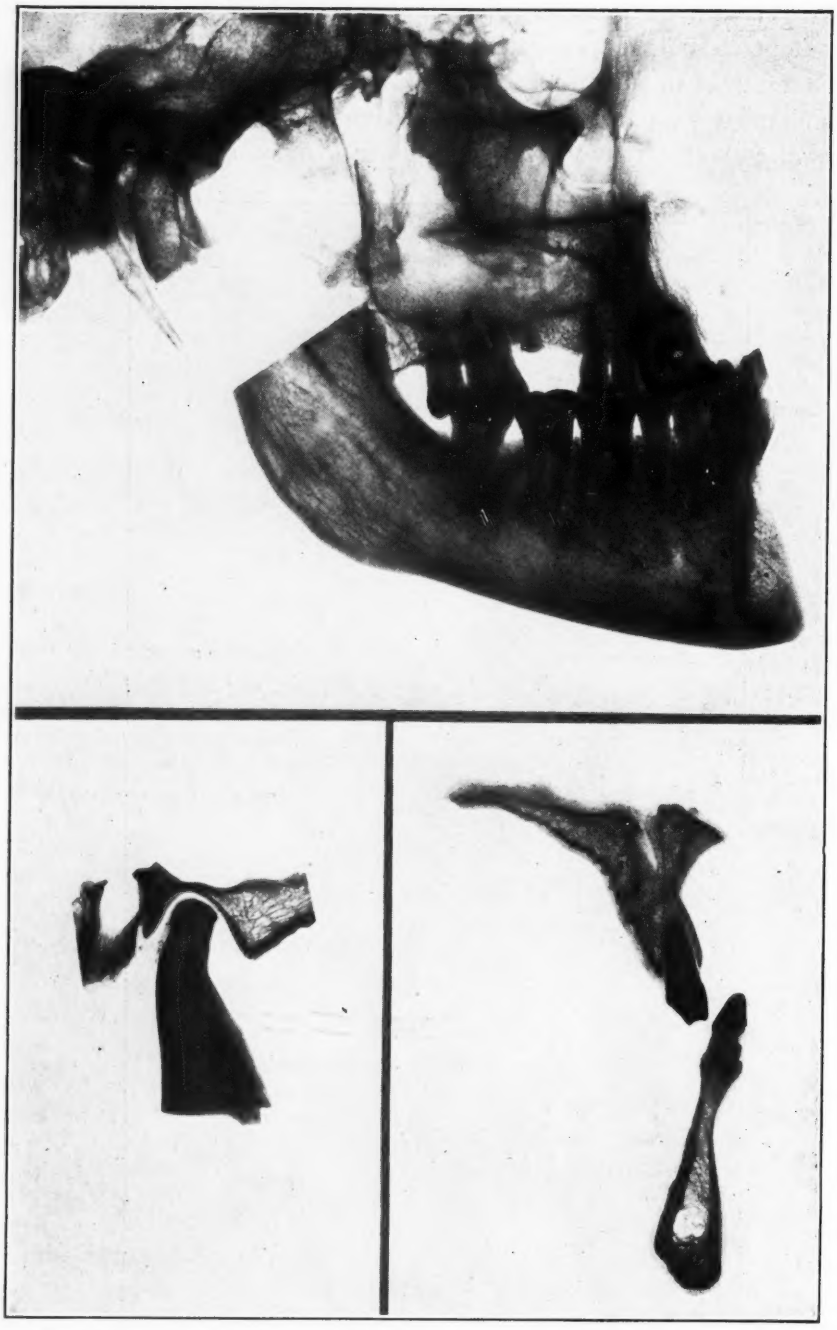


Fig. 7.—In the lateral view note the extreme prognathism which is strikingly illustrated in the axial relation of the maxillary and mandibular central incisors. In order to incise it was necessary to retrude the jaw as far as possible—the reverse of the normal. The result of this alteration of function has indelibly impressed itself upon the external contour and internal architecture of the temporomandibular articulation. Note the shape of the condyle, the depth of the glenoid fossa, the angle of the inclined plane, and the lack of the smooth articulating surface on the crest of tne eminentia articularis. The appearance of the joint is that of the hinged joint of the carnivora.

"The shape of the bones and joints of the deformed part represents nothing else than the expression of a functional accommodation to the faulty static demands made upon it." (Taylor.)

DISCUSSION

President Howard.—Fellows, we have heard two very wonderful discourses this evening. We will now enter upon discussion of Dr. MacMillan's paper. Who wishes to speak on that paper? As a matter of fact, I think there is really nothing to add or to question in regard to Dr. MacMillan's paper. He has shown us the truth, it seems to me, an old truth. The specimens speak for themselves. Dr. Dewey, have you anything to say?

Dr. Martin Dewey.—The only thing I can say is to call your attention to the practical application of Dr. MacMillan's statement that bone is a plastic material controlled by environment. The papers which we listened to today dealt with regulating appliances. If you will stop and modify the definition of regulating appliance as being a device to control environment of bone, you will realize why it is possible to do what Dr. MacMillan has suggested tonight, namely, produce a development of the mandible.

I have heard it said time and time again by men that only the alveolar process can be modified, and not the body of the bone. If you change the environment of the mandible with your regulating appliance, there is no reason that you cannot produce a development of the mandible.

It has often been stated that after you have regulated a case of malocclusion, and produced bone structure by changing the environment of the organ (as Dr. MacMillan has so nicely brought out in his paper, and which I believe is absolutely possible), the bone produced by the changed environment is not the same as the bone formerly existing. Dr. MacMillan showed you cases where the tooth had been extracted, the alveolar socket had filled up, and the bone which was regenerated is shown to be the same as the former bone. Therefore, I believe that the bone created as a result of tooth movement is exactly the same as any other bone that is laid down as a result of biologic laws. And if you accept those things, if you interpret your biologic processes, your development of bone, as Dr. MacMillan showed you, remembering that the regulating appliance is only one way of changing environment, and try to produce that environment as nearly normal as possible, you will be able to produce results which some men have considered to be impossible.

President Howard.—Does anyone else wish to discuss Dr. MacMillan's paper?

Dr. Robert Dunn.—I would like to ask the Doctor a question. I would like to ask him if he has taken any specimens of cases where a bridge or artificial denture had been worn between the teeth, for instance between the molar and a first premolar, or between a second molar and a second premolar.

President Howard.—Are there any other questions? Any further discussion? I don't want to hurry you. If not, I will ask Dr. MacMillan to close the discussion.

Dr. Hugh W. MacMillan.—In answer to Dr. Dunn's question, in the November number of the American Dental Journal, I reported a case showing the development of the lingual plate, where the external contour and the internal architecture was comparable to that of the alveolar ridge before the loss of the buccal plate. Due to osteomyelitis, the buccal plate had been thrown off as a sequestrum. As a result of the stimulating effect of the artificial restoration, the lingual plate had taken over the function and all the physical characteristics of the original alveolar ridge.

I think it has been pretty definitely proved that the alveolar process may be stimulated physiologically by artificial restoration, provided those artificial restorations are so constructed that they will not produce a pressure atrophy. That is some work which is being done more by the prosthetic men, and mostly by the Chayes group of men, who are getting together, I understand, a lot of illustrations of that fact.

I was interested in the discussion of Dr. Dewey when he said the question had been brought up that the bone which filled in the socket, or the bone which formed after the tooth had been moved, was not true bone. I have heard about that before. In order to work that out definitely, for some months past we have been making histologic sections of these areas which I showed, and in a short time I think we will have something very definite to show you.

One of the first questions that a histologist asked me when we started this work was, "Why should there be any difference between the alveolar process and other bone?" I told him that I didn't see that it could be any different, but because of the fact that the question had been raised, it would be interesting to work it out from the histologic standpoint as well as from the radiographic standpoint.

I want to thank you very much for the interest displayed in my paper and for the many expressions of friendship I have received. I think the great trouble about a man coming a long distance to address a gathering is the fact that he feels he doesn't give you your money's worth unless he talks to you for about two or three hours, but if you will pardon me for the extra time I have taken I will do better the next time.

A FRAME TO PREVENT THUMB SUCKING

By Dr. T. T. Moore, New Orleans, La.

SO MANY mothers asked me how to prevent their children from sucking their thumbs that I devised the plan given below to correct and prevent this habit. Parents are to blame for encouraging this habit because it is a ready and easy pacifier, but many do not realize the deformities which may be caused by thumb sucking. The method I have employed may be a little severe, but it is more effective than binding up the thumb or using bitters or mittens, and many children who have not been affected by the prescriptions of their physicians, stop sucking in a week or ten days after I apply the frame.

We know that pressure exerted by the thumb, followed by additional pressure of the tongue on the palate, exerts a tremendous force which is not normal in the mouth and causes a high V-shaped arch with protrusion of the anterior teeth and maxillary process, also extreme development of the lips.

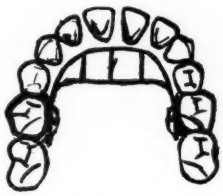


Fig. 1.

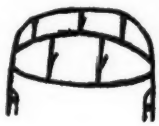


Fig. 2.

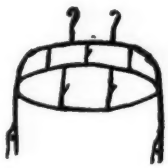


Fig. 3.



Fig. 4.



Fig. 5.

Dr. Sylvan Dreyfus, in the October, 1925, issue of *The International Journal of Orthodontia, Oral Surgery and Radiography,* gave us a very excellent detailed description of the deformities caused by thumb sucking.

CONSTRUCTION OF FRAME

Plain bands are constructed for the maxillary second premolars with half-round tubes. Half-round wires are soldered to a 19-gauge wire and adapted to the cast, extending forward to the first premolar, care being taken that the cast does not rest on the palate. This prevents the suction with the thumb as in Fig. 1. On the anterior of the body wire is soldered a 21-gauge wire with three wires connecting, making a frame. To the middle wire is soldered a 22-gauge wire, cut short and sharpened. The patient must be seen on the second day after the appliance is put in because it is usually necessary to round the points of the spur to prevent too much irritation to the tongue. I then wait

until the fourth day before I see the patient again and in most cases the spur can be smoothed off at that time; though the frame is left in the mouth for two weeks as a reminder. Generally this is all that is necessary, but in extreme cases a second frame is added posterially, as in Fig. 2, with additional spurs. These patients are so persistent that they usually move the thumb to the lingual surface of the incisors when the second frame is added, making it necessary to add two anterior wires following the outline of the lingual surface of the centrals, over the incisal edge and resting on the



Fig. 3 and 4.



Fig. 4.

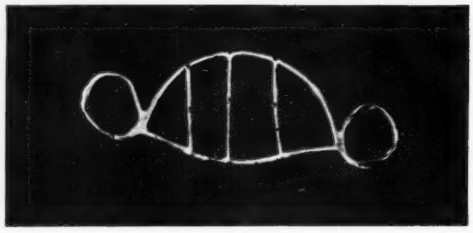


Fig. 5.

incisal third of the labial surface. Care must be taken that the wire does not rest on the incisal edge, as that would cause retrusion of the centrals (Figs. 3 and 4).

REMOVABLE FRAME

Fig. 5 shows a removable frame made on a Brophy stone cast. The Crozat crib is made for the second premolars and two lingual wires are adapted to the cast and soldered to the crib. The connecting wires are added and the spurs soldered. This type is very satisfactory when the child wants to stop and is willing to help.

CLINIC REPORT—OCCLUSAL ADJUSTING PLANE*

By Norris C. Leonard, D.D.S., Baltimore, Md.

THE device which I wish to show is for the purpose of securing more positive intermaxillary force in making mesiodistal adjustments of the teeth, and of the maxillary and mandibular bones. This is an appliance which is, at the present time, only in the experimental stage, and has been in use only fifteen months, during which time about ten or twelve cases have been treated. It consists of a metal shell, or series of attached shell crowns, formed to fit the mandibular buccal teeth, and having a sliding top which is operated by a screw bar on the buccal side of the appliance. The occlusal, or sliding part, is cast of hard gold, with the accurate impressions of the faces and cusps of the opposing teeth indented into its occluding surface. This device is cemented to the mandibular buccal teeth so that the occluding maxillary teeth will fit into the impressions on the sliding top when the jaws are in their usual mesiodistal relations.

The very gradual movement of this sliding top, with the slight change at intervals of the occlusal rests in their relation to the occluding planes, provides during mastication a normal functional force, which may be accurately controlled and directed, and is delivered equally to both arches, though in opposite directions. The forces utilized are identical with the normal physiologic forces which nature employs in the development of the jaws, though the application may be somewhat modified through the tying together of a group of teeth.

This appliance may be used either in unilateral or bilateral cases; but its greatest usefulness, as would appear from its limited application so far, will be in bilateral distoclusion cases in which the entire mandible needs developing forward and the bite needs to be opened. In such a case an appliance would be adjusted to both sides of the mandible and connected with a removable lingual bar which should be in contact with the lingual surfaces of the anterior teeth at the gingival line, carrying, if necessary, finger springs for individual tooth movement of the anteriors. The appliances, while in place, open the bite about 2 mm., though the actual distance between the two jaws is lessened somewhat by depression of the teeth to which they are attached. The opening of the bite permits of greater freedom in developing the mandible forward; and when the latter has been gradually brought to the correct position and the appliance removed, the buccal teeth gradually erupt into occlusion, with correct cusp relations, without further interference.

So far I have not in any of these cases used any retaining device whatever. In two of the bilateral cases treated, though they were left for several weeks after the appliance had been removed, with only the anteriors in nor-

*Read before the Twenty-fifth Annual Meeting of the American Society of Orthodontists held at Atlanta, Ga., April 14-17, 1925.

mal contact, there has been no indication of the slightest relapse of the mandible or the teeth toward the original position. This would seem to me to indicate a positive bone change back of the tooth area in the mandible itself, which insures stability until normal cusp relations are completed by full eruption of the buccal teeth.

For unilateral cases of distoclusion the appliance is, of course, used only on the side to be corrected. As nearly all these cases also need the bite opened, the teeth on the opposite side, which are at first held apart, may be allowed to come into occlusion. This occurs within two or three weeks, usually, partly by the elongation of the teeth held out of occlusion, and partly because the teeth on the side of the appliance are slightly depressed in their sockets. By the time the treatment is completed the teeth that have elongated on the normal side should have become firmly enough set to retain a part of the distance gained between the jaws, while the teeth on the side treated come into occlusion after the removal of the appliance.

The principle utilized in this device, it would seem, would be just as efficient in the treatment of mesioclusion cases, though I have not yet had an opportunity to test it out in this class of malocclusions. While only about a dozen cases have been treated so far with this appliance, all cases have responded very positively and satisfactorily with the exception of one in which the deciduous teeth supporting the appliance loosened and the device had to be removed. This was a case of mixed dentures in which all the deciduous molars showed early absorption of the roots. My impression is that the appliance may be more satisfactorily used in cases where the deciduous teeth have all been replaced by the permanent ones, though some of my successful cases have had mixed dentures.

The average time for the complete treatment with this device has been about four and a half months. In no case has there been, at any time, soreness or discomfort of the teeth. There is but slight inconvenience in mastication in the beginning, for a day or two, after which the appliance seems as efficient for this purpose as the natural occlusion. A half turn of the screw bar at weekly intervals shifts the occlusal rests about one-sixth of a millimeter, which is hardly noticeable to the patient and produces no discomfort whatever. The occluding teeth soon adjust themselves perfectly to the new position without tipping, and mastication in perfect balance continues throughout the treatment.

The amount of movement necessary to secure correct cusp relations is measured during the construction of the appliance and just this measure of adjustment provided for. This will enable the operator to calculate pretty definitely the time necessary to accomplish the movement and will limit it to just that desired.

It has not been determined yet as to whether the device should be removed as soon as the movement is accomplished, or left in place a while for retention.

In my own cases the appliances have been removed as soon as the movement was completed, keeping the cases under very close observation in order to note in time any tendency to relapse before the cusps were interlocked

in their correct relations. In only one case have I thought it necessary to replace the appliances.

Three of the cases treated are illustrated with photographs of models before and after treatment:

Fig. 1 shows models of the first case treated; the patient was a male, fifteen years of age. The upper cast shows the position of the teeth when the appliance was removed, the bands having been adjusted with a view to applying a retainer if indicated. The final position in the lower right model shows that there was practically no change of the mesiodistal relations while coming into occlusion without the use of any device whatever, though it was nearly three months before all the teeth were fully erupted.

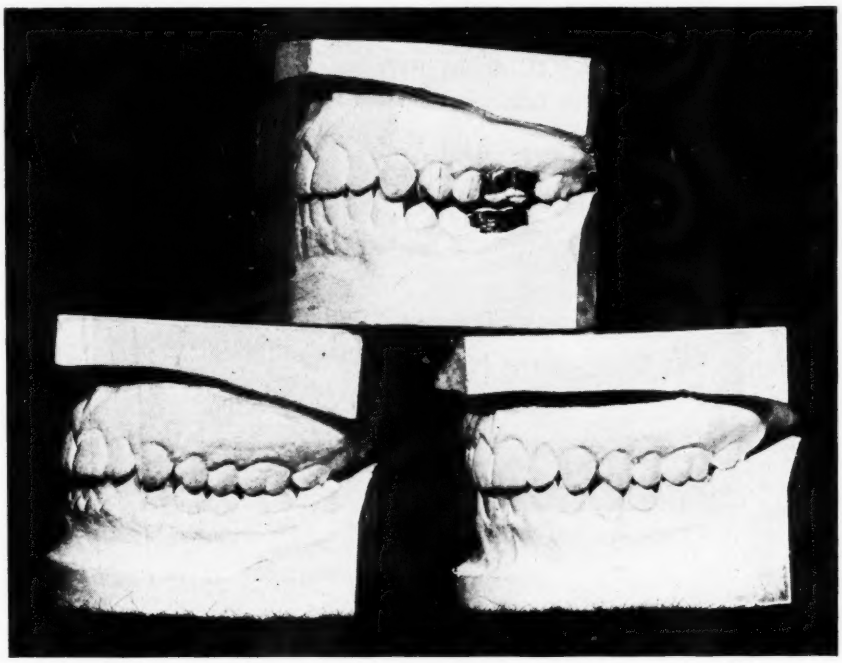


Fig. 1.

The second case, in which the patient was a male, fifteen years of age, is shown in Fig. 2. This was bilateral, though only the right side is shown. Owing to faulty technic of construction of the early models of the appliance and a consequent stripping of the threads of the screw-bar of the appliance on the left side, full correction on this side was not secured. However, with only the anteriors in occlusion, the buccal teeth came into position as shown, without retention.

Figs. 3-*A*, 3-*B*, 3-*C* and 3-*D* show both sides of a bilateral case, before and after treatment. This patient was a girl, fourteen years of age, unusually well developed otherwise but very much disfigured by the distal position of the mandible. The case was under treatment just four and a half months, at the end of which period the appliances were removed. The models in Figs. 3-*B* and 3-*D* show the position three months later without the use of retention of any kind. The mandible and chin are in excellent position and cannot, even with an effort, be returned to the former position.

The device is really very simple, and not so difficult of construction as a casual observation would suggest. It consists of two castings assembled together with a screw-bar, a threaded nut and two plain tube journals, the latter two attached to the lower casting and the threaded nut to the sliding top, with the screw-bar through each, and held in place by a swivel nut at its distal end.

The first step in construction is to secure proper spacing of the teeth to which it is to be attached and construct a well-fitted band to the most distal one; then a sharp modeling composition impression of these teeth is taken, and an artificial stone model made, with the band (coated with a film of wax for easy removal) in place. With a thin saw spaces are made between the teeth on the model for insertion of small narrow sections of band material. The model is then covered with heavy tin foil, about .005 inch in thickness, as shown at 1, Fig. 4, and burnished well to every surface of the teeth and gum margins excepting that represented by the band on the last tooth back. Then a sheet of 28-gauge casting wax is laid on in the same way and pressed well to place against the tin foil. With an old razor blade or other thin sharp

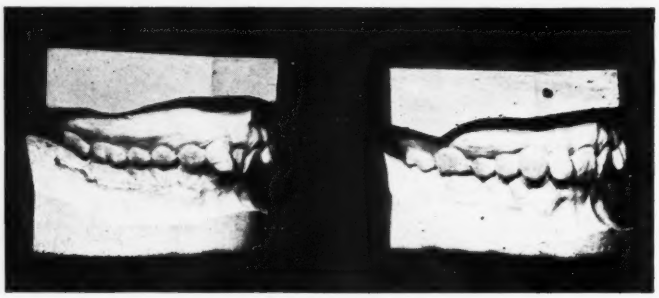


Fig. 2.

instrument, slits are made through the wax and tin at the spaces between the teeth (excepting the space next to the band), and short, narrow sections of high fusing band material trimmed and slipped to place and waxed to the other wax covering. The excess should then be trimmed away, removing the wax and tin from the band on the last tooth, but allowing both to remain over its occlusal surface, and removing that portion in front of the little metal plate at the mesial space of the anterior tooth to be included in the appliance. Two very thin metal plates that have been accurately formed together on a die so as to lock together along the lingual border, and formed to fit approximately the contour of the occlusal surfaces of the molars and premolars linguobuccally, shown in Fig. 5-*A*, are laid carefully upon the occlusal surface of the model, and pressed gently to place in the wax with the straight groove in the central groove of the molars and premolars, and the larger curve over the buccal cusps. This is waxed into place, then the upper sliding plate, 5, is removed, leaving the lower one, 4, attached to the wax shell. The wax is then trimmed to approximately the gingival contour, and the entire shell, including the tin foil and band, carefully worked loose from the model, then pushed back to place.

Sprue attachments are made to the wax just at the margin of the sliding

plate 4, at the lingual side, then investment material mixed thin is carefully spread over the entire outer surface of the shell. When this investment is hardened it insures removal of the shell from the model without distortion. The tin foil, which is used to provide against, or rather to compensate for the shrinkage of the metal, is then removed from the shell, the investment completed, and it is ready for casting. I have found 22K gold best for this purpose, and the casting will slip easily to place, either on the model or in the mouth.

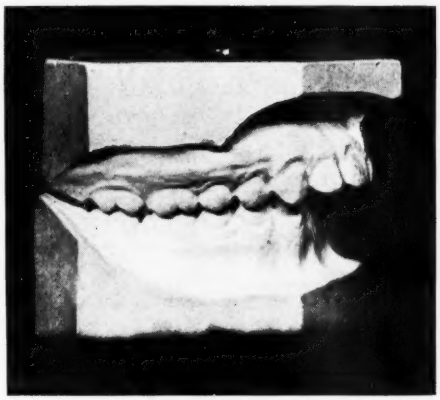


Fig. 3-*A*.

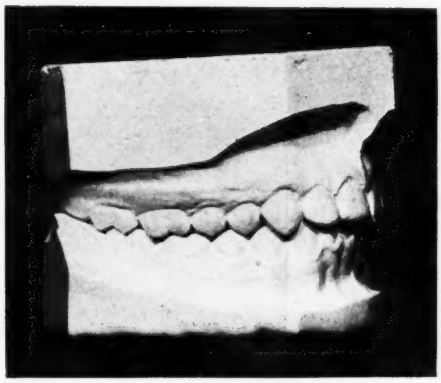


Fig. 3-*B*.

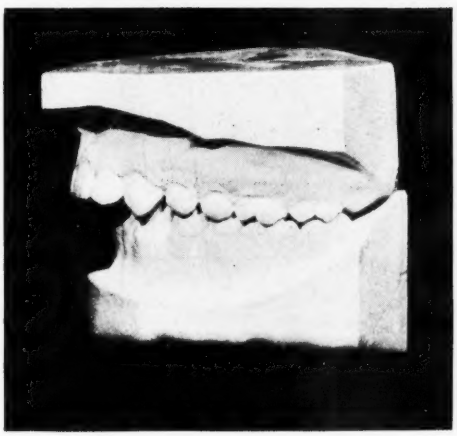


Fig. 3-*C*.

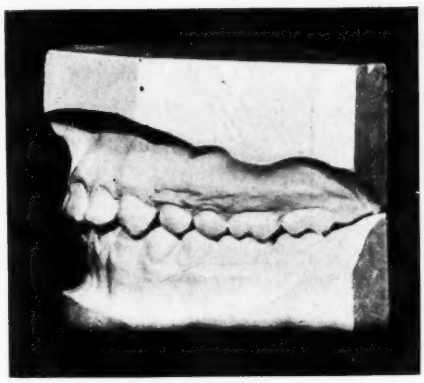


Fig. 3-*D*.

When this casting is finished the next step is the assembling and soldering of the plain tube journals, 7 and 9, in the buccal groove provided for them, and shown in place in Fig. 6. This casting is then ready for trying on in the mouth, and taking the bite.

The upper sliding plate, 5, is fitted accurately to the top of the casting 12, trimming away the portion containing the longitudinal buccal groove so that the journals attached to the casting will not interfere. It is waxed to place, and the screw-bar 10 slipped into place with a piece of blank tubing filling the space between the journals 7 and 9. Casting wax is then melted on the top of the last assembled slide and the patient allowed to bite against the wax so as to make accurate impressions of the facets and cusps of the

occluding teeth in the wax in the usual mesiodistal relation, allowing the points of the cusps to come in contact with the metal plate.

The casting is then removed from the mouth, the wax trimmed of all excess, and shaped as desired in the finished casting to be made from this as a pattern. The upper slide and wax bite are carefully worked off, after the screw-bar has been removed, removing also the blank tube 11, which leaves the pattern grooved for the later assembling of the threaded nut, 8, to the top casting.

The pattern, including the top sliding part 5, is then invested and cast with moderately hard gold. When this casting has been polished it is assembled in place on the other casting 12, and with the screw-bar in place the threaded nut, 8, is waxed to place in the groove made for it in the wax pat-

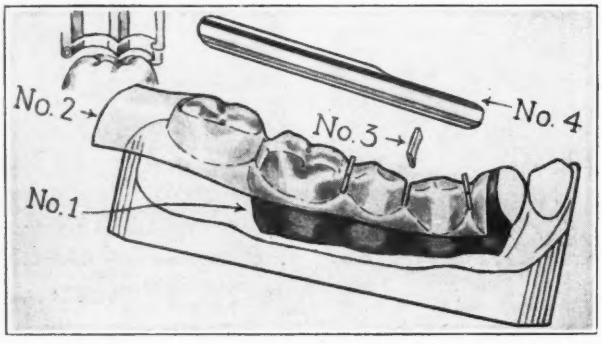


Fig. 4.

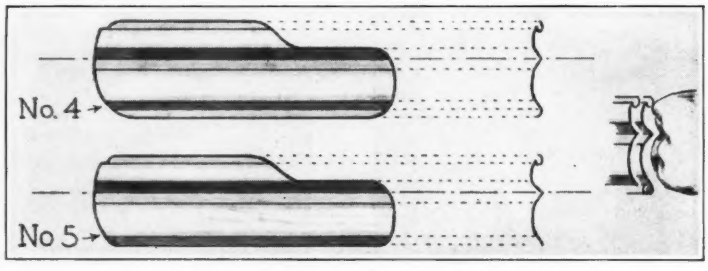


Fig. 5.

tern. If the movement of the mandible is to be forward the nut, 8, should be against the journal 9, and the distance between 7 and 8 should represent the tooth movement desired; if it should be desirable to move the maxillary teeth forward and the mandibular teeth distally, the nut should be placed against the journal 7. The screw-bar is then removed carefully, to prevent the displacement of the nut, which is then soldered—preferably with the aid of a little investment to hold the nut accurately to place.

The entire device is then ready for assembling. With the screw-bar in place, a short section of plain tubing, 6, is slipped on the distal end of the screw-bar, pressed well against the journal, 7, and soldered to the bar with silver solder. This acts as a swivel nut to prevent the lateral movement of the bar, allowing only the top part, 13, to slide. The screw-bar is made of 17-gauge gold-platinum wire, and tempered. Before cementing the appliance to place, holes should be drilled through the shell just at the top of the teeth

as shown in Fig. 8, and these holes filled with gutta-percha so that when it becomes necessary to remove the device a pointed instrument may be forced in to loosen it from the teeth.

To avoid the possibility of the device loosening from the teeth from use, the technic of construction includes one band made from the usual band material, fitted to the most distal tooth, as this is the one from which the appliance would most easily become loosened, and the most difficult to observe if loosened.

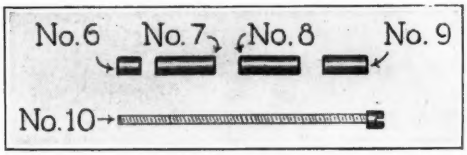


Fig. 6.

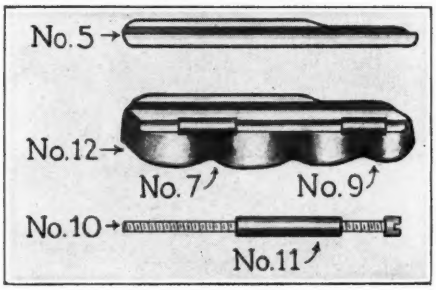


Fig. 7.

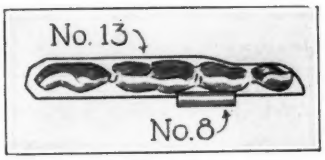


Fig. 8.

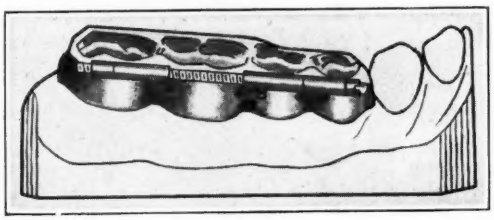


Fig. 9.

So far as I have been able to observe the only valid objection that could be offered to the use of this device is the fact that the teeth to which it is attached are depressed to a certain extent; but the additional facts, that radiographic evidence shows no injury to the subgingival tissues, and the occlusal contacts are ultimately restored, without the teeth having at any time given symptoms of pain or discomfort, would seem to indicate its entire safety, especially in view of the shortness of the time of treatment.

However, a new appliance utilizing the same principle, and which does not cover the occlusal surfaces of the teeth, has just been devised and will be shown at a later meeting.

WHAT THE GNATHOSTATIC MODEL SHOWS*

By Allen Holman Suggett, B.S., D.D.S., M.D., San Francisco, Calif.

WHO has not often heard orthodontists say, again and again, that the teeth in this particular case are too far forward or too distal, or too long or too short? Who has not heard orthodontists say about deep bites that the lower teeth are always too long, or that the upper teeth are always too long? If you ask them, "Too far forward from what?" or "Too long from what?" you will get only a shrug of the shoulder, as much as to say, "Too far from anywhere!" Suppose a man should say, "It is eighteen miles to Granite Mountain," you would naturally infer that he meant it was eighteen miles from where he was standing, or it was eighteen miles from that barrel that Clint told us last year he had buried, or some other important, specified point, not from just anywhere.

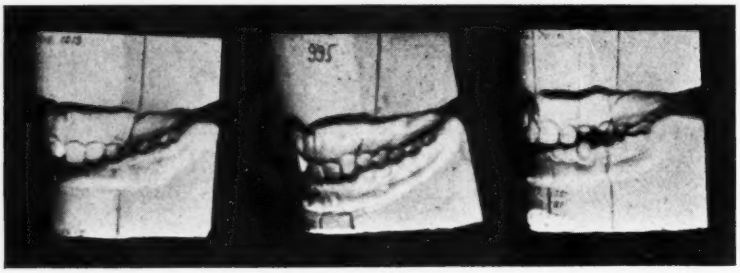


Fig. 1.—The top of gnathostatic models represents the eye-ear plane.

Orthodontists are supposed to be intelligent. So they must mean that teeth are too far forward of something, perhaps the collar button, or too high from the acetabulum. If they had any specific point or plane to measure from, they have never revealed it. So they must mean, from just anywhere.

They surely meant that the teeth were too far forward, or too far back, too far down or too far up, in relation to the head, but what part of the head?

The gnathostatic model is the first successful attempt yet made by which the teeth can be definitely located and measured from three planes of the head. The top of the gnathostatic model (Fig. 1) represents the Frankfort horizontal, or the eye-ear plane, which has been accepted by anthropologists for forty years. From this plane, we can measure the teeth and the curves of the palate (Fig. 2), and, by comparing them to the normal, determine whether the teeth are in abstraction—too far from the eye-ear plane, or in attraction—too near the eye-ear plane. The orbital plane drops down from the orbits at right angle to the eye-ear plane. From this we can measure and ascertain whether the teeth are in protraction—too far forward, or in retraction—too far distal.

*Clinic given before the Twenty-fifth Annual Meeting of the American Society of Orthodontists held at Atlanta, Ga., April 14-17, 1925.

The raphe median line passes through the median line or sagittal suture, at right angles to the other two planes (Fig. 3). From this plane we can determine whether the teeth are in contraction—too near the median plane, or in distraction—too far from it. Bear in mind that all these measurements are in relation to the skull, and are made from planes located outside the area directly affected by malocclusion. From these measurements, we can

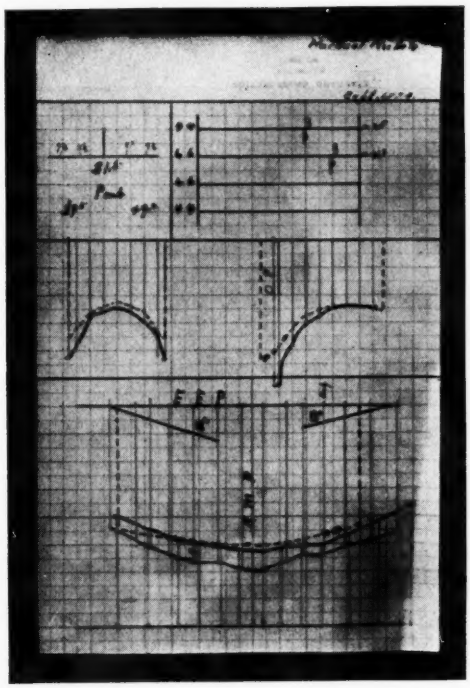


Fig. 2.—From these models we can chart curves of the palate and the length of teeth.

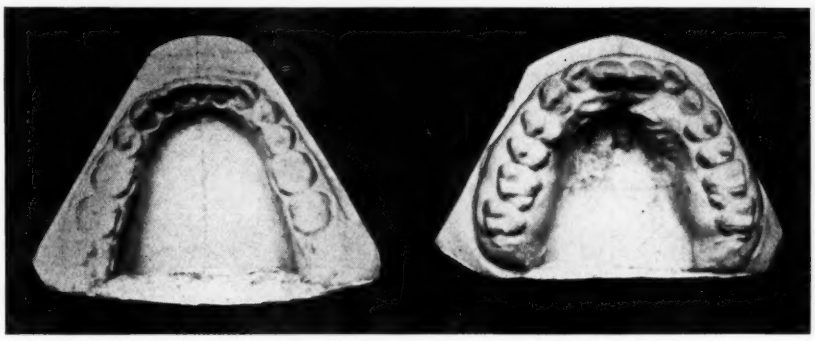


Fig. 3.—Shows the Raphe-median plane.

establish curves and diagrams that give us a complete survey of the mouth in three dimensions. The curves on the chart show that teeth are too long or too short, too wide or too narrow, too far forward or too far back. The chart also shows the inclination of the occlusal plane to the eye-ear plane.

These models will be of assistance to the prosthodontist and bridge worker. Forest Orton, professor of crown and bridge work, University of California, says that these models are indispensable in reconstruction cases.

They are another valuable aid, as are radiograms, in diagnosing malocclusion. They are another step forward, and another problem solved.

There are three great questions that science has never solved. The first "Where are we at?" is now answered by the gnathostatic model. The other two, "Who killed Cock Robin?" and "Who struck Jimmie Patterson?" are still unanswered.

The ancient astrologer did not need science or intelligence. He had his whiskers. In the middle ages, they "got by" with their tin armor. In mod-



Fig. 4.—Shows the orbital plane.

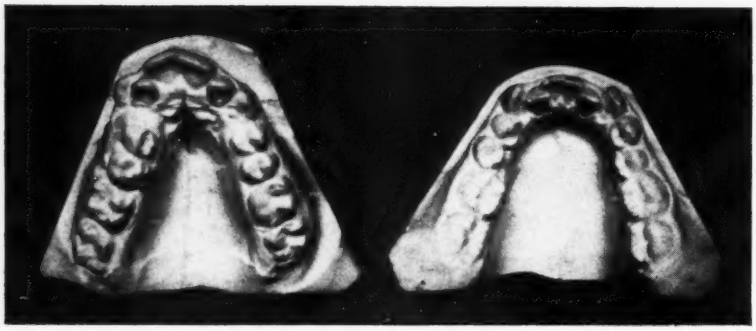


Fig. 5.—Shows where the orbital plane + Raphe-median plane intersects palate.

ern times we let them pass because they wore a silk hat, a long coat and a cane. Those good old days are gone. The conditions and customs of the times have deprived us of all these outward signs of wisdom. All brains and no intelligence is not enough. We must develop and use intellect, science, and other aids in diagnosing. The day has passed when we can look at a plaster model, stroke our beard, and forthwith cast the horoscope right off the bat, of a complicated case, especially if those horoscopes were cast in the second constellation of the zodiac, or, taurus, which in our language is called "bull."

DISCUSSION

Dr. B. E. Lischer.—I don't know that I can add anything to this discussion. I rather agree with what Dr. Suggett had said. I realize, of course, that for the man who is not familiar with the technic, and because of the fact that there is very little available in our literature, especially in the English language, whereby one can get a better comprehension of the subject than you can from just one presentation, many of us must go a little slow before we can master it. It will take time, but no doubt it will help all of us who will try to work out our problems by this method, to solve them in a far better manner than we have ever solved them before.

As my good friend, Waldron, wrote the other day, now that he has taken up gnathostatic methods of diagnosis, he feels like quoting Henry W. Longfellow where he says: "Things are not what they seem."

Any one who has not attempted gnathostatic methods in diagnosis can't have any idea of what things really are like until he tries those methods. I am seeing things, too, every day, that I had a faint idea—shall I say a hunch?

Dr. Ralph Waldron.—No.

Dr. Lischer.—* * * * existed. Of course, I knew they existed but couldn't prove or demonstrate them, not only to others, but I couldn't demonstrate them to myself satisfactorily.

Now that I have the objective evidence (it must not be a subjective opinion), that I can visualize and feel and measure (to use the method of science), I can see these things that I knew were there. If any one will read the paper I presented at Atlantic City in 1921, when I was trying to show that we needed a finer differential diagnosis in cases of distoclusion, and compare that with the message in Simon's book in 1922, they will see we were striving for the same thing; but now we have a practical way of actually demonstrating it. And I am glad to see that my friend Suggett has taken this up. I know that he, too, will remain a progressive.

Dr. A. H. Suggett.—The only thing I would add is to caution you against confusing diagnosis with treatment. This is not a method of treatment. This is a system of diagnosis.

One of our leading members said to me today, "I was a little bit prejudiced against this system because in the case that Dr. Simon showed last year he extracted some premolars in a twelve year old patient."

I said, "That has nothing to do with the case whatever."

Dr. Simon never presented this as a method of treatment, or as etiology, but only diagnosis, and he also admitted to me that the American orthodontists are far ahead in the technic and handling of cases. He didn't seem to question that at all. He seemed to think that we were a little behind in some of our research work. He would have perhaps one way of treating a case, and we another. All that we are discussing, is diagnosis, to try to find what the truth is. For instance, if a physician diagnoses a case as endocarditis, the diagnosis of the case has nothing to do with the treatment. One man might treat that in one way and a Christian Scientist might perhaps treat it by absent treatment.

Here is your diagnosis. Now then, it is up to you to do the rest of it. So if this will be of any assistance to you in diagnosing your cases, Dr. Simon will have accomplished what he started out to do. Some of us might have a complex or a prejudice, or a scientific basis for not extracting, and we may be right. So treatment is not the question we are discussing at all, and has no place here. This is only an aid to us in our diagnosis, and then the treatment is up to us.

I think we were shown by the papers that have been read here that we have made tremendous progress in the technic and mechanics. But I think that the scientific diagnosis is going to help us a great deal. We want to know where we are going. I think we ought to have that conception before we start, or an approximate conception of where we want to arrive at.

CASE REPORT*

By A. H. Ketcham, D.D.S., Denver, Colo.

I WILL report a case of a simple cyst, apparently caused by irritation from a devitalized deciduous tooth. (Fig. 1.) This patient, a boy eleven years of age, is robust and a little above normal weight. His dentist reports that two years ago last December the boy had a pulpless mandibular deciduous molar filled, after treatment with creosote and eugenol.

Now, I wish to impress upon you the importance of Dr. Gorman's paper and emphasize the importance of a routine check-up with dental films, and also extraoral plates, preliminary to the diagnosis of a case. In Fig. 1, the



Fig. 1.

area below the deciduous molars was discovered, or the upper part of it, through the use of dental films, by my associate Dr. Humphrey; then this extraoral picture was made by Dr. Brownlie, as I was on a vacation. The case was operated on by Dr. Mallory Catlett, an oral surgeon, and I will read his report:

"These cysts are spoken of as simple or root cysts, caused from irritation of devitalized teeth. This cyst involved the follicles of the erupting permanent teeth. It was situated within the body of the mandible, beneath the left lower first and second deciduous molars and deciduous cuspid.

*Read before the Twenty-fifth Annual Meeting of the American Society of Orthodontists held at Atlanta, Ga., April 14-17, 1925.

"As the fluid collected within the capsule, the bicuspids were forced distally, the cuspid mesially, and the mandibular canal and its vessels and nerves down to the lower border of the bone.

"The operation was performed under local anesthesia. The three deciduous teeth involved in this area were first removed and then the mucoperiosteum was retracted and the cyst opened and its contents, a semiliquid yellow material, was removed by irrigation. Following this, the capsule containing this material was dissected out, leaving the permanent teeth visible. The buccal plate of the jaw was found to be expanded to eggshell thinness and a part of it loosened and was removed in the operation. The patient has been seen frequently since and a satisfactory prognosis is predicted."

I can report from x-ray examination made two months after the operation that apparently granulations of new bone are beginning to fill the cavity; also that the canine and first premolars have moved toward each other until they now are nearly touching.

DISCUSSION

President Howard.—Discussion is open on this report now. Are there any questions?

Dr. M. N. Federspiel.—I wish to call attention to the fact that there is a vast difference between root-end and follicular cysts. There are two distinct types of cysts. A follicular cyst always develops from the formation of the follicle, which enlarges with the disformation of the epithelia; the center liquefies and then keeps on developing. A root-end cyst is really a false cyst and forms at the root-ends of teeth.

This case is interesting, like most cysts are, because it goes to show that persistent irritation always causes absorption of tissue.

CASE REPORT*

Extreme Case of Bilateral Distoclusion with Labioversion of Maxillary Incisors

By T. Wallace Sorrels, D.D.S., Oklahoma City, Okla

I AM prompted to offer this case report for your consideration by reason of the many interesting factors it presents for serious thought. For convenience of study we will discuss it under the salient points of etiology, diagnosis, prognosis, and treatment.

The primary causative factors from both a theoretical and clinical aspect were evidently the combined influence of nasal obstructions and an abnormally large tongue. Theoretically the enlarged tongue is usually caused by local inflammation, and enlargement of the lymph vessels called lymph-



Fig. 1.



Fig. 2.

angiectasia or from muscular hypertrophy called megaloglossia. The abnormally large tongue is known as macroglossia whether or not it be the result of either one or both of these causative factors, it being only reasonable to assume that these conditions may be the result of excessive exercise and prolonged irritations of mild degree. Abnormal use of the tongue during infancy and its growing period should therefore be carefully watched and the habits be prohibited if the abnormally large dental arches and interrupted contacts of the teeth are to be prevented. A study of the malocclusion and associated facial deformity as illustrated by Figs. 1, 2, 3, 4, and 5, has, as will be noted, all the characteristics of a severe and extreme case of bilateral distoclusion with labioversion of the maxillary anterior teeth.

*Read before the Twenty-fifth Annual Meeting of the American Society of Orthodontists held at Atlanta, Ga., April 14-17, 1925.

Any attempt to establish harmony in the mesiodistal relationship by extraction of the first maxillary right and left first premolars and moving the six maxillary anterior teeth distally as frequently advocated and practiced by many in treating cases of advanced years with similar types of malocclusion, would be sure to result in failure. Any reduction in size of the dental arches is made prohibitive by the action of the abnormally large tongue.



Fig. 3.

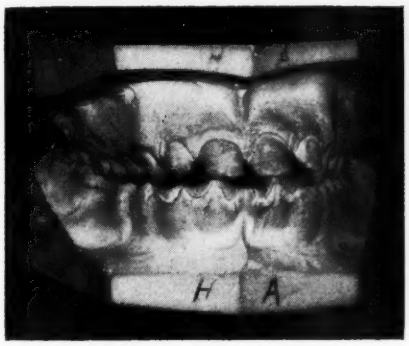


Fig. 4.

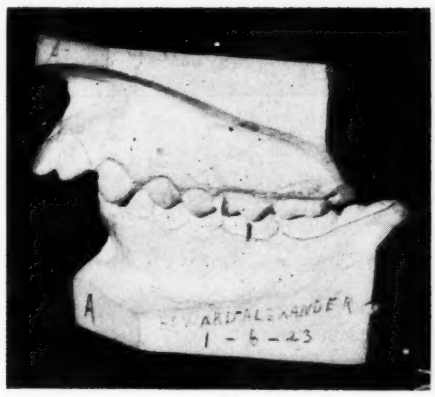


Fig. 5.

The usual plan of treatment for cases of this class, such as retracting the maxillary incisors and moving all the maxillary teeth distally and all the mandibular teeth mesially, would be impractical. Clinical experience has demonstrated that the prognosis under this plan of treatment would be too unfavorable. This plan of treatment would require several years of watchful care and then probably result in failure as is almost invariably the rule with cases of this class and type at this age. Such a plan of treatment is

further complicated by the absence of the mandibular first molar. After carefully analyzing the case as a whole, the following plan of procedure was decided upon as being the most practical method of treating the case. The maxillary incisors were moved distally into an approximal relationship and a more perpendicular position. The mandibular anterior teeth, including the incisors, canines, first premolar and second premolars, were moved mesially to compensate for the distal relationship of all the mandibular teeth and establish harmony in the mesiodistal relationship of the dental arches. This is best illustrated in Figs. 8 and 9.

Plain molar bands with horizontal buccal tubes to receive .038 round gold platinum alloy wire were placed on maxillary first molars. Bands with labial brackets to receive the arch were made for all the maxillary incisors. The lateral and central incisor bands were used alternately to maintain a balanced relationship of the incisors and give each the benefit of rest peri-

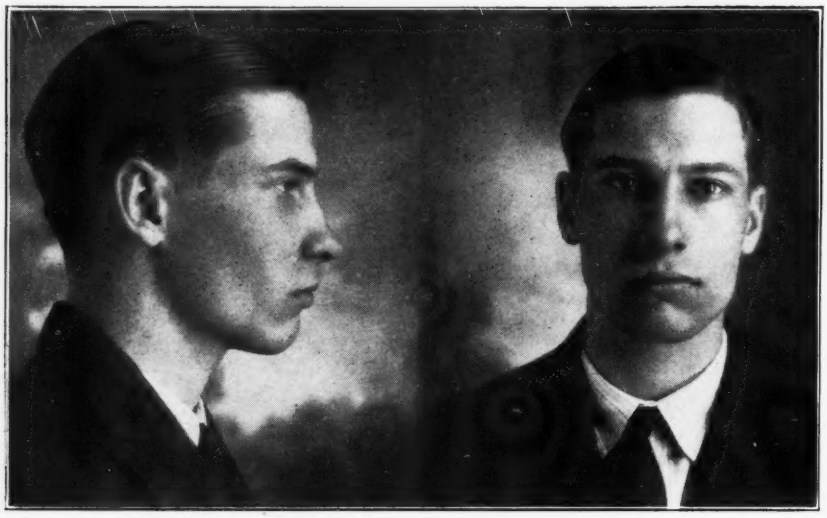


Fig. 6. Fig. 7.

ods. Hooks were soldered to the arch just distal to the laterals to receive intermaxillary elastics. Spring loops of .028 hard drawn wire were soldered to the arch just anterior to the buccal tubes with space allowed between them to permit the arch to travel distally in retracting the maxillary incisors. Wire ligatures were used about buccal tubes and spring loops to stabalize the arch and assist in moving the incisors distally. Long hooks were soldered to arch in the cuspid region to receive intermaxillary elastics.

Plain bands with ribbon arch sheath tubes were placed on the mandibular left first molar and mandibular right second molar. Ribbon arch bracket bands were placed on the second premolars. Depressor hooks for mandibular incisors and finger spurs just distal to brackets of the right and left second premolar bands made up the auxiliary attachment to the mandibular arch. Finger springs of .028 hard drawn wire were soldered to the buccal surface in such a way as to rest in contact with the brackets on the premolars, and extending lingually across the distal surface of the second premolars, were

used after sufficient space had been made between second premolar and first molar to receive the wire. Finger springs were used at the beginning of treatment on the right side where the first molar is now absent. This prevented a rotation of second premolars and more equally distributed the applied force on these teeth. Nuts on the arch were used to move all the incisors, canines, and premolars mesially. The mandibular molars served

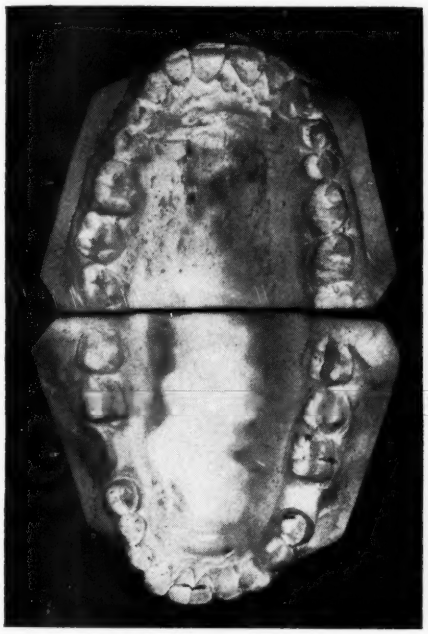


Fig. 8.

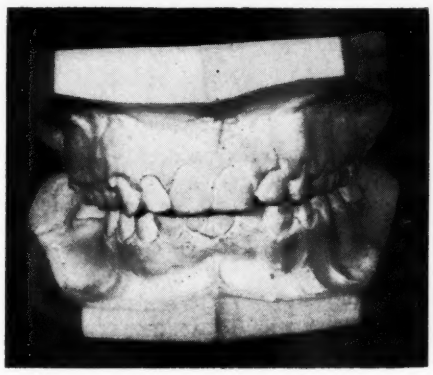


Fig. 9.



Fig. 10.

as a fulcrum for moving the ten teeth mesially and were reinforced by the use of the intermaxillary elastics which also moved the maxillary incisors distally. Wire ligatures were used about lower incisors in combination with ribbon arch bracket bands which were used alternately.

A plain lingual alignment wire of .038 gauge soldered to molar bands with finger springs extending bucally and located distal to right and left second premolars was used to retain the mandibular teeth. A plain labial

alignment wire of .038 gauge soldered to molar bands with incisal hooks over central served as retention for the maxillary teeth. Bridge work will be inserted to fill space created by the mesial movement and loss of the first permanent molar which will act as a permanent form of retention.

Massage and a special exercise of attempting to draw the maxillary lip downward and suck it in between the maxillary and mandibular teeth has greatly increased the size of the upper lip which was much below normal in size.

This young man, who is a premedical student, is now a normal breather and proportionately has a better lease on health and life as well as the pleasure and benefits to be derived from his improved appearance. Figs. 1, 2, 3, 4, and 5 illustrate the case before treatment, while Figs. 6, 7, 8, 9, and 10 illustrate the case after treatment. The elapsed time between the models and pictures of before and after treatment is two years and three months, but the patient is still under retention.

DEPARTMENT OF

ORAL SURGERY, ORAL PATHOLOGY AND SURGICAL ORTHODONTIA

Under Editorial Supervision of

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THE IMPORTANCE OF ORAL DIAGNOSIS IN THE PRACTICE OF EXODONTIA*

By Sterling V. Mead, D.D.S., Washington, D. C.

(Professor Oral Diagnosis, Georgetown University.)

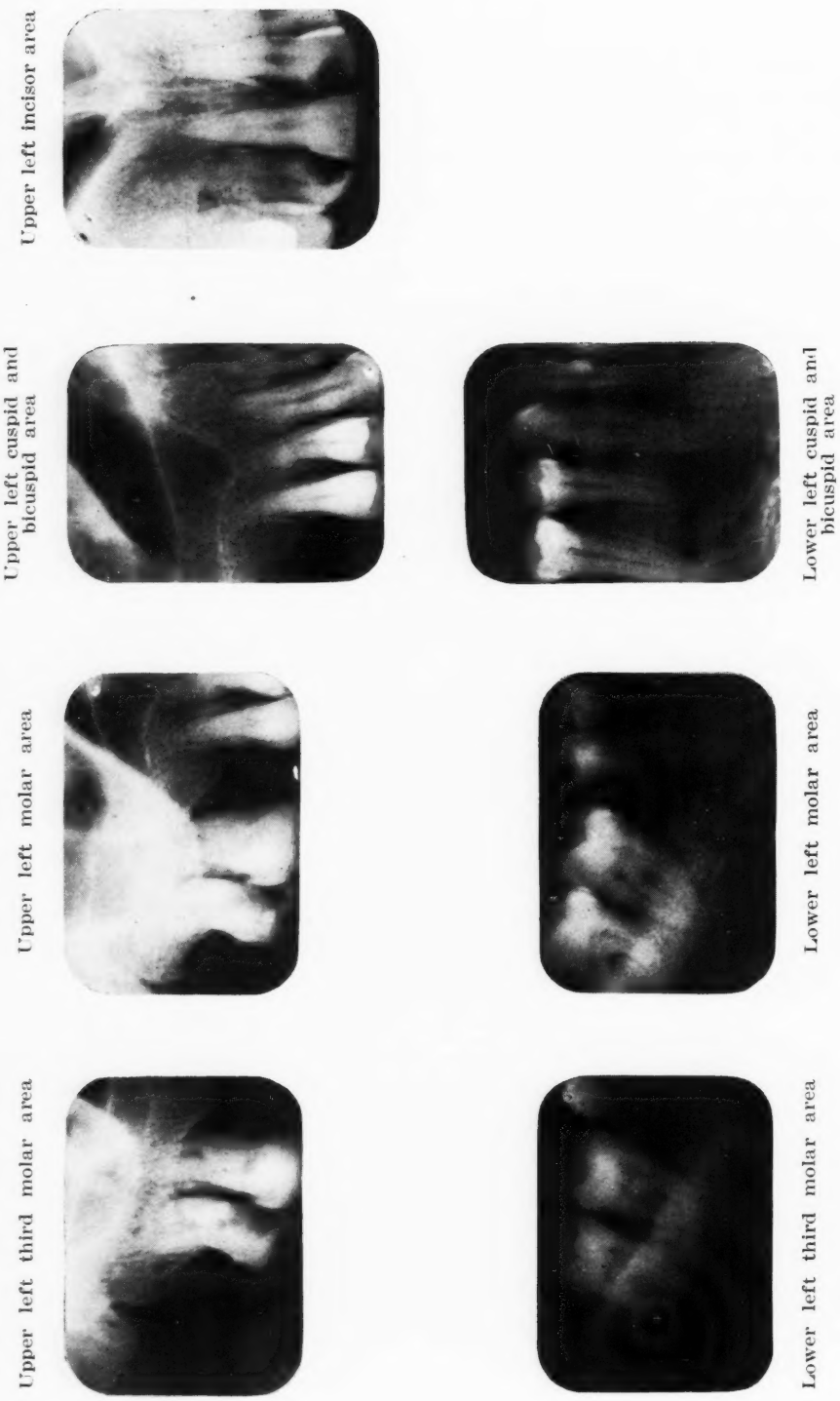
DIAGNOSIS is of paramount importance in every branch of medicine and dentistry, and with the recognition of the etiologic importance of dental foci as a factor in general systemic disorders by the entire medical world, there has been an insistent demand for a standardized procedure in oral diagnosis, and at Georgetown University the subject is taught both to dental and to medical students.

Diagnosis is of vital consideration from the time of the first examination until the operation is complete and the case dismissed; it enters into every phase of our work. The field of diagnosis, therefore, is so large that only a summary of some of the important factors can be reviewed in a paper of this nature.

Whether one is known as an exodontist or as an oral surgeon, it would be difficult to limit one's field to simple extraction of teeth without proper surgical training and a knowledge of at least minor oral surgery and recognition of all pathologic conditions of the mouth. It seems to me that this type of work calls for special training and experience.

It would appear to me that anyone who is capable of removing impacted teeth should be able to perform such operations as reduction of fractures, removal of cysts, incision for drainage, etc., and be in command of unusual situations arising out of the surgical treatment of a case. If unable to recognize dangerous conditions, one will often not know until too late that he is in need of aid.

*Read before the joint meeting of the Virginia Tidewater Dental Association and Dental Unit U. S. Naval Hospital, Norfolk, Va., May 4, 1926.
Received for publication, June 19, 1926.


Upper left incisor area
Upper left cuspid and bicuspid area
Lower left cuspid and bicuspid area
Upper left molar area
Lower left molar area
Upper left third molar area
Lower left third molar area

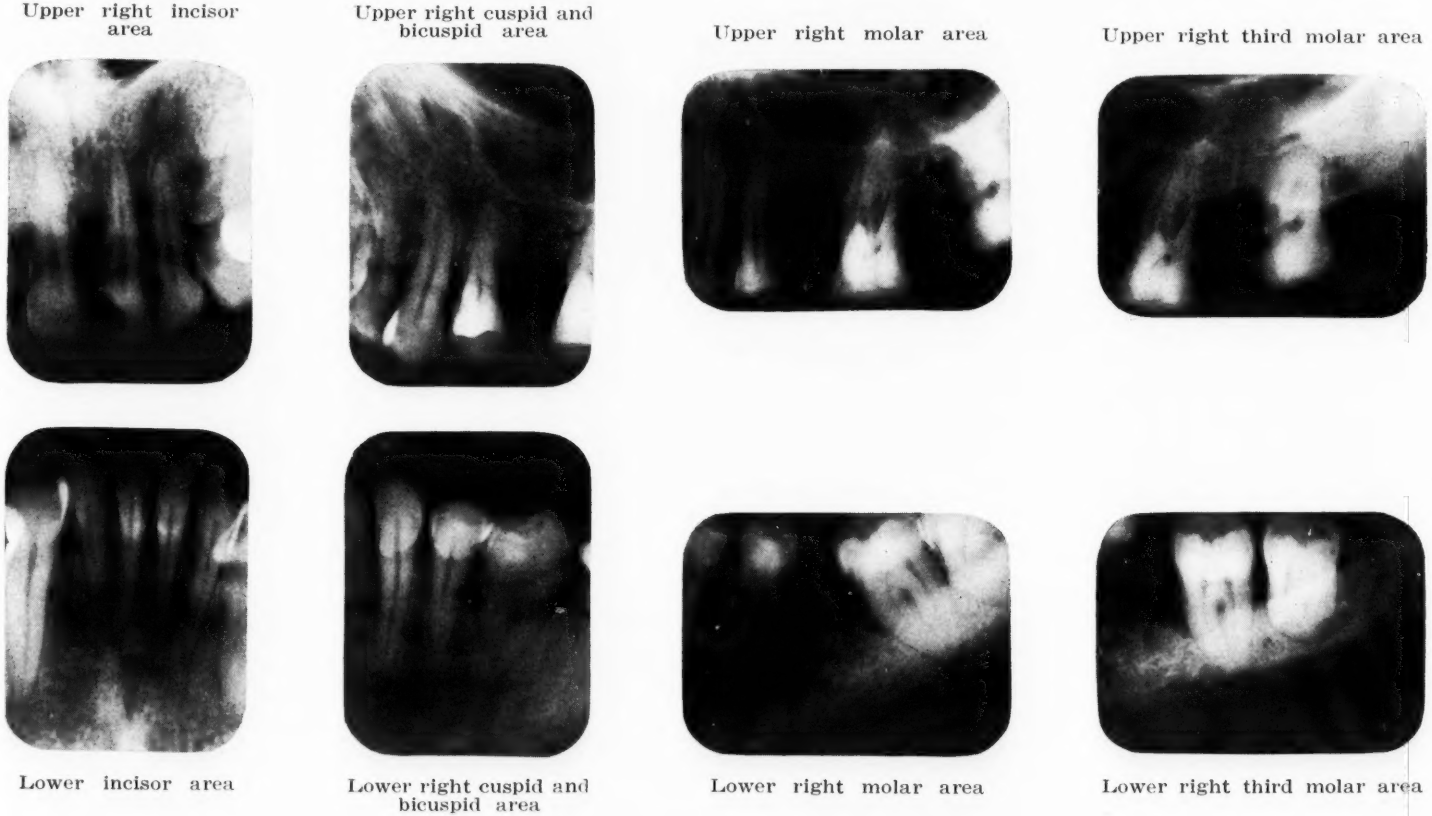


Fig. 1.

Fig. 1.—Radiographic study of a mouth showing marked peridontal pathology.

Cavities shown in upper left molars, upper left lateral, upper right central, upper right lateral, and upper right last molar. Deep peridontal pathology shown upper left molars, upper right molars, lower left second molar, and lower right second bicuspid; general peridontal pathology also shown.

Lower incisors show salivary calculus. Lower right first molar root shows periapical pathology.

Diagnostic skill can be achieved only by years of experience and personal observations founded upon routine examinations and the recording of their results.

An examination should be made of the entire mouth, having in mind the appearance of the normal condition, and each variation from the normal should be detected. The examination should include the lips, tongue, floor of the mouth, hard and soft palates, buccal mucous membrane, gums, gingiva, teeth, maxillary bones and maxillary sinus, as well as swellings, sinuses and glandular involvement on the external surface of the face.

Size, complexion, and physical and mental characteristics of each patient should be observed. Every abnormal condition should be noted.

EXAMINATION OF THE PATIENT

The examination should be conducted in a routine manner, the results of the examination being recorded upon some suitable printed chart, so that an accurate and positive diagnosis may be made, which can be quickly consulted. The following plan may be used:

1. Complaint
2. History
3. Manifestations of pain
4. Physical examination:
   - (*a*) Ocular
   - (*b*) Percussion and palpation
   - (*c*) Exploration
   - (*d*) Color
   - (*e*) Conductivity of temperature
   - (*f*) Transillumination
   - (*g*) Radiograms
   - (*h*) Pulp-testing by electric current
5. Bacteriologic examination
6. Pathologic tissue examination
7. Biologic and chemical tests: Wassermann reaction
8. Differential diagnosis
9. Treatment recommended

RADIOGRAMS

I advise full mouth radiograms in all cases. This is one of the important diagnostic steps, without which a diagnosis cannot be made properly. They also serve as a record and relieve the operator of any uncertainty. I have a routine of making a standard set of fifteen views of the entire mouth, taking later the additional views indicated.

Radiograms of the area involved should be made both before and after extraction. In a private practice this routine is sometimes hard to follow, but it is the ideal way, and can be accomplished in most cases.

In oral diagnosis the radiogram is of value when used as an adjunct to other clinical findings. There is no other single factor which will give so

much valuable information, or which may be so deceptive as the radiogram. When used to supplement other clinical methods of examination, radiograms are indispensable in most cases.

To be of value, the radiogram must show all details clearly, and in many cases a number of views of the same area should be taken. The prerequisites for correct radiographic interpretation are thorough knowledge of embryonic development, histology, pathology, bacteriology and anatomy, and a knowledge of dentistry, so as to supplement the findings of the radiogram with the clinical findings.

The radiogram shows pathologic changes in hard tissue and not in soft tissue, and successful radiographic technology demands the clear definition without undue distortion of tooth structure, pulp chamber, root canal, peridontal membrane space and periapical space, stratum durum, alveolus and



Fig. 2.—Circumscribed periapical osteitis.



Fig. 3.—Diffuse periapical osteitis.

surrounding osseous structure. Other structures of importance are maxillary sinuses, objects in the soft tissues, and the joints.

Bone changes shown by the radiogram are:

Periodontoclasia
Periapical Osteitis
    Diffuse type
    Circumscribed type
Cyst
    Radicular
    Dentigerous or follicular
    Multilocular
Necrosis and Sequestrum
Osteomyelitis
Osteosclerosis
Osteogenesis

IMPACTED TEETH

The clinical symptoms which may arise from unerupted or impacted teeth depend upon two factors: First, the position of the tooth and its relationship to other structures and its proximity to other teeth; second, the presence of suppuration or infection.

While it is true that there are many local disturbances due to irritation from impacted and unerupted teeth, these conditions are, however, greatly overestimated as regards their general systemic effects.

I believe that many impactions should be removed purely from a local standpoint to prevent crowding of the dental arch, danger to adjoining teeth,

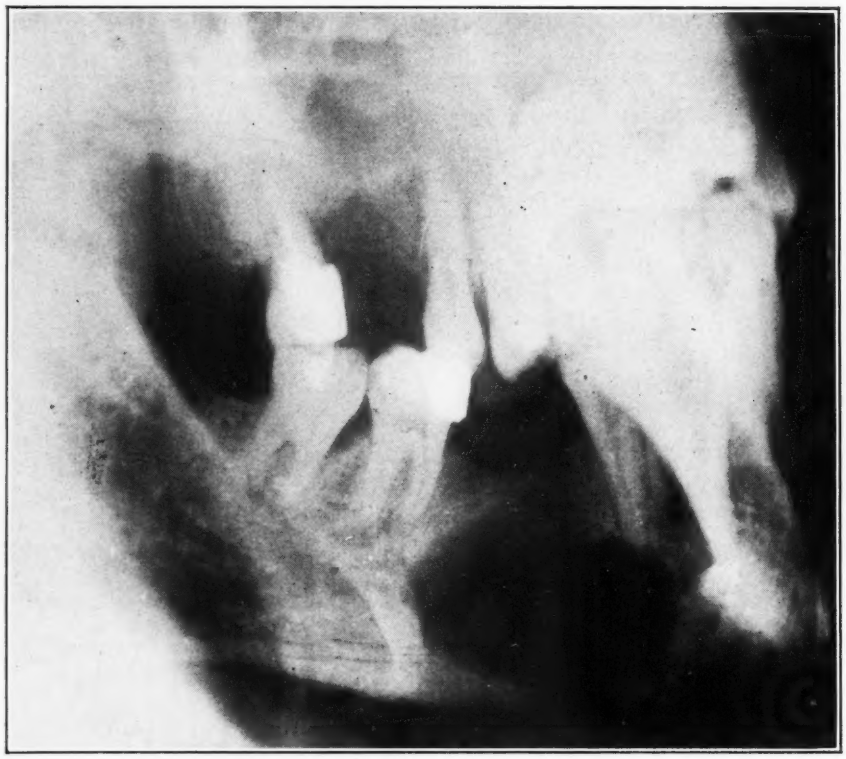


Fig. 4.—Radicular cyst of mandible.

etc., and I believe all impacted teeth showing pockets or bone absorption where infection can occur should be removed. I do not believe all impactions should be removed, as to do so would cause mutilation and discomfort without benefit to the patient in many cases. Many instances may be cited where impactions have remained undisturbed for years without any general disturbance or local manifestation.

LOCALIZATION

Before attempting an operation for removal of imbedded teeth, foreign bodies, instruments, etc., the exact location of the object sought should be definitely determined; this will simplify the operation greatly.

Palpation is useful in locating bodies in the soft tissues, such as stones,

etc., and in certain other conditions. Probing is of some value. Radiographic examination, however, proves to be the most valuable aid in localization and may be accomplished by:

1. Single radiograms
2. Two or more views taken from different positions
3. Two or more views, moving the tube each time in the same direction
4. Use of metal wires or probes
5. Stereoscopic radiograms

A single radiogram, while lacking perspective, proves the easiest and most useful method of determining the position of unerupted and impacted teeth. The single radiogram should be taken correctly so as to show the least possible distortion.

In intraoral views there should be no overlapping of contact points of approximate teeth. In the location of the third molars the contact between

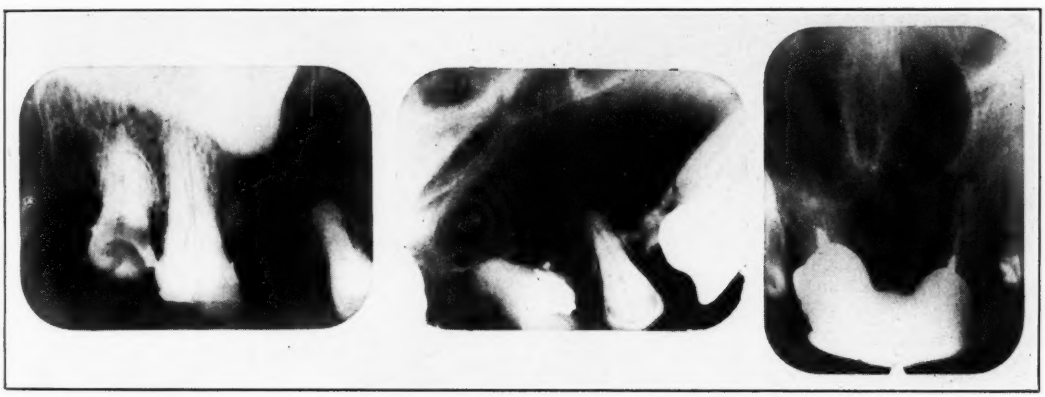


Fig. 5.—Radicular cyst of superior maxilla extending from left molar to right cuspid area.

first and second molars is the key to the correct angle, as this should be normal with no overlap. If a lower third molar appears to overlap the second molar in a view of this kind it lies to the buccal side, as our knowledge of anatomy proves it could not lie to the lingual because of the thin inner plate. The upper molar may lie to the lingual or the labial side, but palpation will usually locate the tooth if overlapping is shown in radiogram.

As the impacted tooth inclines more toward the lingual side, the smaller the root and the larger the occlusal surface of crown shown. In complete lingual displacement, where the occlusal surface of the crown faces the lingual, there will be no root formation seen when the radiogram is taken in an ordinary manner. The root, however, can be shown by placing the film in the usual manner for a lower molar and setting angle of tube in position for an upper molar exposure; and vice versa, for showing the root of an upper molar. This also applies to bicuspids.

The Simpson method of placing the film between the teeth and taking the radiogram at a vertical angle has some advantages and will show location when there is definite buccal or lingual position.

In the localization of impacted cuspid teeth, one view usually proves sufficient. Most impacted cuspid teeth lie lingually to the other teeth. When the cuspid lies buccally to the other teeth, it may be located by palpation, owing to the thin outer plate and tissue over roots, etc. It is true, therefore, when a cuspid is shown to overlap other teeth and cannot be located buccally by palpation, that it lies to the lingual. There are some few cases



Fig. 6.—Double impaction of lower left second and third molars and bone pathology.

where this method does not give the desired information, such as edentulous cases, where there are no other teeth by which to gauge position, and in cases where an unerupted or impacted cuspid does not overlap other teeth but is erupting in normal mesiodistal relationship.

In all cases detail is clearer with the stereoscopic method, and in many cases perspective is shown. Perspective is not shown in all cases, as in those where the object or impaction lies extremely close to the other teeth; the

distance between them is not sufficient for accurate perspective. The greater the distance the greater the perspective.

Stereoradiography is more useful in localization of broken instruments and objects in the soft tissues, and in bone not lying immediately approximating the teeth. Stereoradiography is, therefore, limited in its usefulness in localization.

Two or more views taken from different positions may be used to best advantage in the case of impacted cuspid teeth not overlapping each other, and in objects and instruments closely approximating the teeth. This method, described by Raper, Ivy and others, is based upon the following principle: In observing two objects in a direct line, the more distant object will appear to the right when the observer moves to the right, and the nearer object will appear to the right when the observer moves to the left, the more distant



Fig. 7.—Lower right deep impacted third molar and osteitis.

object moving in the direction taken by observer. Therefore, applying this principle to radiography, in a lingual impaction where the object is more distant than other teeth from tube the impaction will appear to move to the right in a succession of films, each taken a little further to the right. If the impaction lies to the labial of the other teeth, it will appear to move to the left in a succession of films each taken a little further to the right.

Two or more different kinds of views are often desirable, such as the lateral head view and posteroanterior or anteroposterior to locate roots in the maxillary sinus, and to locate foreign bodies in the bone.

TRANSILLUMINATION

Transillumination is an aid in making a diagnosis of mouth conditions, but it has its limitations.

In the examination of the maxillary sinus transillumination is most useful, though it may be misleading, as the bones on one side may be thicker than

those on the other. Transillumination is more satisfactory for persons whose tissues are not thick and dense, as in the case of children.

Transillumination will not disclose areas of periapical infection about the teeth. Peridontal infection may be shown by transillumination where the peridontal membrane is separated from the cement and the root is discolored. The diseased area will appear dark.

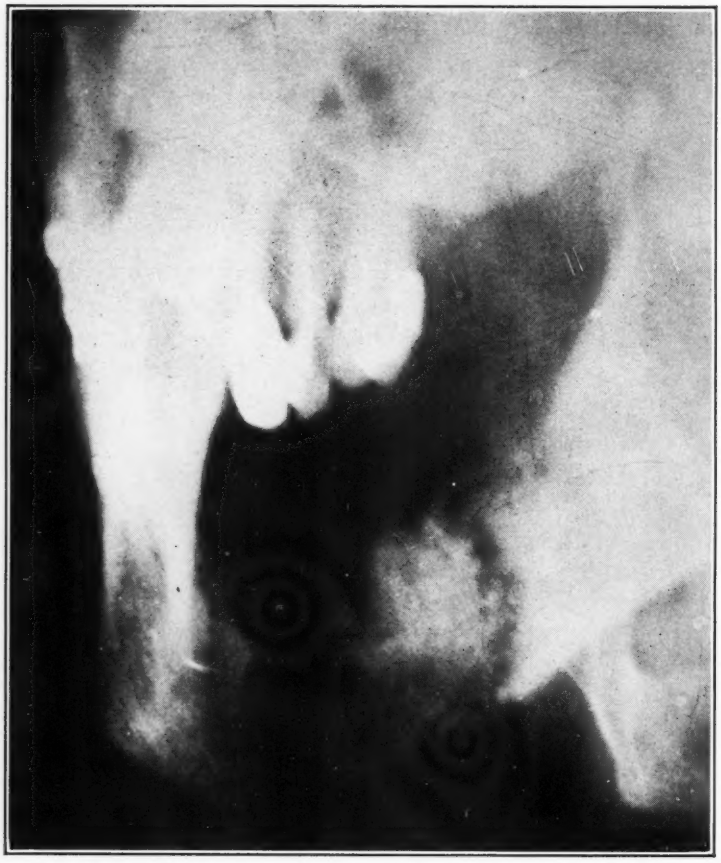


Fig. 8.—Sequestrum and double unilateral pathologic fracture of mandible resulting from osteomyelitis.

ELECTRIC PULP TEST

The radiogram and other means are often confusing and lacking in positive information; the pulp tester is unreliable when used without radiograms. The most satisfactory procedure is to obtain first, where possible, radiograms of the entire mouth, and to supplement this with the use of the pulp tester as a check for vitality.

PULPLESS TEETH

I do not believe a pulpless tooth is necessarily a dead tooth. This term is very misleading. There are two sources of nourishment for the tooth: through the pulp, and through the peridental membrane. Where the pulp is lost the tooth may possibly be retained if there is no peridontal or periapical

pathology. I feel confident that I have seen many pulpless teeth in the mouths of patients for years without any local or general symptoms of trouble.

Treatment.—I recognize that single rooted teeth may occasionally be treated successfully where they are infected, even though there be bone pathology. The chance of success is in direct proportion to the extent of tissue destruction, number of roots, and accessibility of canals. The most favorable cases are those in which the vital pulp has been aseptically extirpated and the root canal immediately filled. When the pulp undergoes decomposition, the chances decrease, and when periapical disease is established, treatment is then very questionable, there being some hope if there is



Fig. 9.—Carcinoma of mandible.

no bone pathology. When there is definite bone pathology treatment is practically useless.

There can be no doubt that skillful root canal technicians have more chance of success than the average man, but I have not observed a high average of success among these men, except in selected cases.

My observation has been that where one tooth is treated successfully by the average man, there will be ninety-nine failures. I, therefore, do not recommend treatment of the infected teeth through the root canal, except in selected cases.

I believe that apiectomy is successful in selected cases. I confine myself to the upper six anterior teeth, where there is a sufficient amount of healthy bone structure left for retention of the tooth and where the health of the individual will permit.

Nature's method of root canal filling in the case of threatened security of the pulp by exposure of the dentin through caries, erosion or abrasion, is the formation of a layer of adventitious or secondary dentin between the exposed surface and the pulp. This process may continue until the entire pulp is obliterated by the formation of secondary dentin, thus destroying the vitality of the adjacent dentin. Such teeth are not subject to periapical disease, which proves that the dentin when deprived of its connection with the pulp is not of itself harmful.

The ideal root canal filling is one which fills the canal completely and extends just to and not through the apex. Filling the canal completely is not

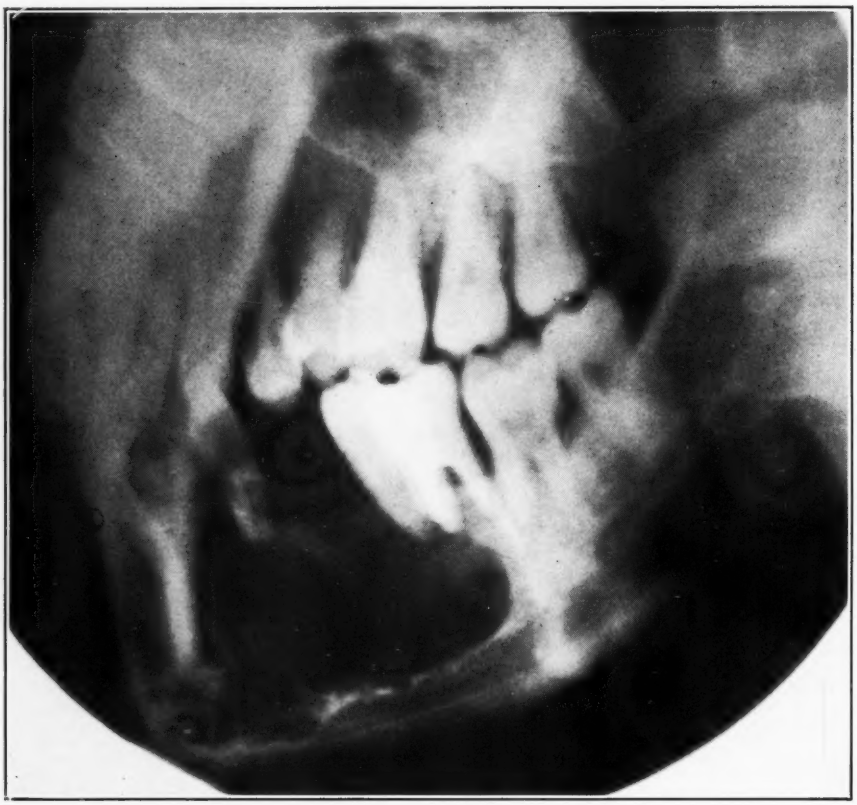


Fig. 10.—Sarcoma of mandible.

as important as removing the organic tissue and sealing the canal aseptically. Many teeth with apparent imperfect root canal fillings are in better condition than those with the filling protruding through the apex. Where the filling protrudes through the apex there is always a defective area demonstrable in the radiogram where there has not been perfect union between the tissue and the foreign body, and this is always a questionable area when a search is being made for a focus of infection.

Diagnosis.—My experience with pulpless teeth proves to me that one cannot be too sure of a diagnosis. I feel unable to diagnose accurately periapical pathology about pulpless upper bicuspids and molars directly bordering upon the maxillary sinus.

One of the bad features of the pulpless tooth problem is the fact that when one examines a mouth and finds no periapical pathology about pulpless teeth, and has occasion to see this same case later (from a month to a matter of years), he often finds definite pathology. So I have found that pulpless teeth do not remain constant, but that the condition may change, and I therefore advise periodic examination of them.

The evidence from a bacteriologic examination of the apices of pulpless teeth should not be accepted as a criterion for determining whether or not to remove them. Haden,[1] in an examination of three hundred and ninety-two vital teeth, found but 46 per cent of them sterile and 54 per cent infected, and out of nine hundred and fifteen pulpless teeth cultured he found 14 per cent sterile.

Grove[2] has demonstrated the absence of all evidence of infection in the apical tissues of many pulpless teeth which he has sectioned, and Hatton[3] has found that certain teeth with demonstrable periapical lesions may return to normal after treatment and filling of the root canal.

In making a diagnosis of apical infection, no one method can be depended upon, but must be used in conjunction with the other methods. The following are the accepted methods:

1. The radiogram is the most valuable aid we have for determining the existence of apical infection. By it we can determine in most cases whether or not there is bone absorption or pathology. The radiogram usually shows the results of infection in the bone, but does not reveal infection. Pulpless teeth may harbor infection in the root canal, dentin and periapical tissues, without visible absorption of bone or apices of roots being disclosed by the radiogram or by any other means. The radiogram does not show pathology of soft tissue. It is an aid in determining the presence of infection, but is not to be considered absolute proof. Radiograms are very deceiving where the pathologic bone area is small, as it may be disclosed in one view and not disclosed in another. Therefore in questionable teeth more than one view is desirable.

2. The electric vitality test is a valuable aid when used in connection with the radiogram to determine which teeth are pulpless.

3. Transillumination is valuable to show peridontal tissue infection in most cases, but does not show periapical infection. Not every infectious process will cast a shadow, but when a shadow is cast, it is diagnostic of infection.

4. Digital, ocular and exploratory examination may reveal the presence of pus or peridontal pathology, or even periapical fistulae not disclosed by the other methods.

5. In doubtful cases where the other methods do not show definite infection and it is suspected, the health of the individual must be taken into consideration, and in this connection the condition of the blood is of value. The examination may disclose a certain deviation from normal of erythrocytes, leucocytes, differential, hemoglobin and clotting time, and from this deviation the index is computed. Patients with a high index may retain questionable

teeth and keep them under observation. Patients with a low index or an index less than 90 per cent require drastic removal.

Summary.—In determining when to extract a pulpless tooth it is, therefore, necessary to take into consideration many factors. Each case should be handled as good judgment and experience indicate, and with but very few exceptions along the following lines.

My practice is to recommend extraction of:

1. All teeth showing evidence of periapical bone involvement.
2. All pulpless teeth in patients whose health is seriously endangered.
3. All pulpless teeth showing marked peridontal bone absorption (periodontoclasia).
4. All pulpless teeth directly bordering the maxillary sinus.
5. All third molars when pulpless.
6. All pulpless teeth when the root formation precludes the possibility of a good root filling.

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CASE REPORT*

By Dr. S. L. Silverman, Atlanta, Ga.

I FELT some hesitancy in showing (I only have four slides) one of these cases, but as it was very interesting to me from the standpoint of what to do in a case of deformity where there are no teeth present, even though this patient was six or seven years of age, I decided to report it.

This (Fig. 1-*A*) is a kodak picture of a little girl who had a very mutilating operation done. This originally was a case of double harelip, and the general surgeon, who should have known better but didn't, removed the intermaxillary bone, along with the central portion of the lip, leaving this horrible appearance as you see it, in full view (Fig. 1-*B*). In order to correct

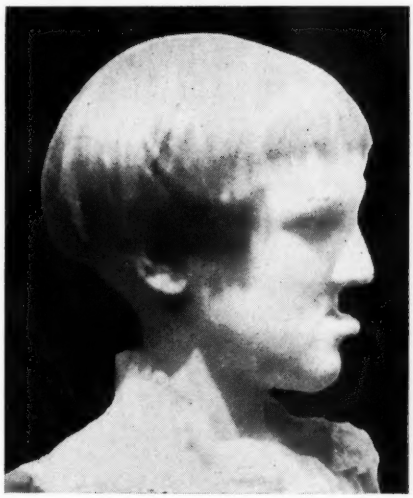


Fig. 1-*A*.



Fig. 1-*B*.

his mistake, he frantically began to turn flaps from the palate, and in doing so he ruined all of the permanent teeth, for she has no permanent teeth now.

This patient presented herself a little over a year ago, and I made an incision, opening up the upper lip, and then making an incomplete "V" incision in the lower lip, the flap was inverted and placed in the upper lip.

Fig. 2 shows the child about the third or fourth day after the operation, with the stitches still in place. Her lips were sewed together so that crying and fretting would not injure the flap, and she only had the corner of the mouth open, to admit liquid food. After ten days, the flap was cut loose and the lower lip sewed together.

Figs. 3-*A* and *B* show the condition after the operation. This is the place where the V-shaped portion of the lower lip was taken out, and shows the correction by surgical means, and surgical means only.

*Read before the Twenty-fifth Annual Meeting of the American Society of Orthodontists held at Atlanta, Ga., April 14-17, 1925.

If I have made any statement inferring that orthodontia could have been of no service here, don't hop on me, but hop on Dr. "Endocrine" Howard (laughter) because I talked with him about this case; in fact, he told me that on account of that scarred upper lip, even if the patient had had teeth, the teeth would not have remained had he corrected them, because of the pull of the upper lip against the anterior teeth.

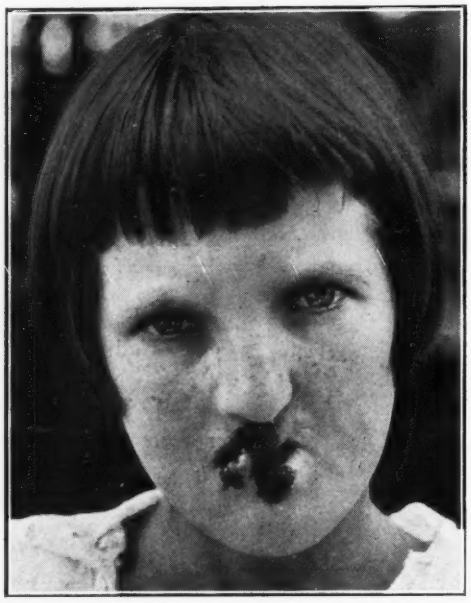


Fig. 2.



Fig. 3-*A*.



Fig. 3-*B*.

With regard to fractures of the neck of the condyle, the medical and surgical literature does not offer us any help on the reducing of the condyloid process. Some advise removal of the head of the condyle and others totally ignore it. I have found, and Dr. Blair agrees with me, that the average case of ankylosis is due to a fracture at the neck of the condyle. Perhaps the word "average" takes in too much territory. Let us say, rather, that a num-

ber of fractures, particularly in children, result in ankylosis. If you recall, in his lecture Dr. Blair pointed out the fact that a fall on the chin had produced various cases of ankylosis which, of course, were preceded by a fracture.

This operation that I have devised was tried in two cases, one of the cases living here in Atlanta. It consists simply of making an inch incision just at the tip of the coronoid process, then taking the periosteal elevator, or any smooth dull instrument, inserting it within the mouth, and forcing by blunt dissection past the inner surface of the coronoid process, and engaging the head of the condyle, which whenever displaced is always forward and inward due to the pull of the external pterygoid muscle. (Fig. 4.) This is the internal pterygoid muscle. The external pterygoid muscle cannot be shown because it is attached just exactly where this instrument has engaged it. This is the external lateral ligament. The tuberosity of the upper jaw

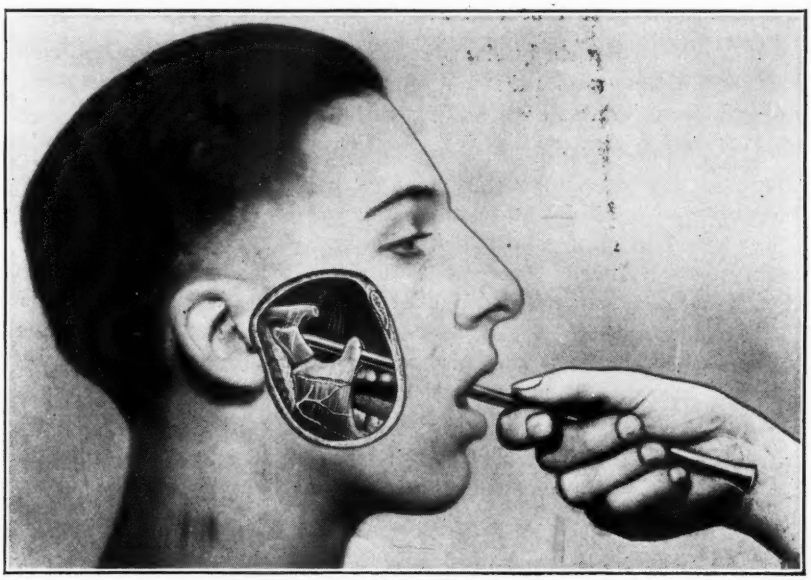


Fig. 4.

is used as a fulcrum, so as to engage and push this backward and outward. We already have our intermaxillary wires in place, not shown in this cut, and while I am holding this in position the assistant engages the two intermaxillary wires and firmly fixes the jaw in place; and it so remains for a period of six weeks.

This can be done under local anesthesia, and as far as vulnerable anatomy is concerned, it is all on the outer surface of the ramus and you need have no fear because this is the parotid gland shown in cut sections, this is the facial nerve, this is the masseter muscle also cut. There is no vulnerable anatomy on the inner surface of the ramus or anywhere along in this region.

DISCUSSION

President Howard.—Gentlemen, you have heard this very interesting report by Dr. Silverman. Is there anything to be said in regard to it or any questions to be asked?

I will start it off by saying that Dr. Silverman is unquestionably correct in those bad operative cases, where quite a proportion of the lip has been taken out and it is perfectly tight with scar tissue. I failed on two of those cases in the course of my life, and I just

wish I had gone to him first and gotten this information that it is possible to do this V-shaped flap operation and produce a pliability of the upper lip. Otherwise, you can't, orthodontically, keep those front teeth in place.

Does somebody else wish to discuss this case?

Dr. H. E. Kelsey.—As you know, I have been interested in this type of case, and I just want to emphasize something that Dr. Silverman referred to, but which I think he could have emphasized a little stronger with benefit, and that was his statement that the removal of the intermaxillary bone invariably produces not always as bad a mutilation as his case showed but nevertheless always bad, and practically eliminates the usefulness of the orthodontist to the patient afterwards.

I have been in conference with Dr. Staige Davis on some cases, and he is collecting evidence to show that the removal of the intermaxillary process in these bilateral cases is one of the worst procedures that can be followed, and I am sure that Dr. Silverman's report supports this contention.

Outside of that, I wish to compliment Dr. Silverman on an operation that seems to me almost miraculous in the results that he obtained and especially on the ingenious method he employed for getting the tissue for the upper lip from the pendulous lower lip, correcting the lower at the same time that he was supplying tissue to the upper.

President Howard.—Somebody else asked Dr. Silverman if this operation that he suggests is to obtain the same results that Dr. Blair got by loosening up the cheeks and pulling forward in that way; in other words, making an incision on the inside of the cheeks to give room. Is the operation that you suggest for the same condition that he did that other operation?

Dr. Silverman.—No. I did an operation yesterday or the day before to loosen up all the tissues, in which I loosened all the tissues back as far as the first molar. That is done only to bring the nose forward. The nose in this case that I reported today was normal.

I forgot to mention one thing: that this result was not obtained in one operation. There was a second operation. The patient had what we call microstomia, that is, a very tiny mouth, the corners being not more than twenty-five millimeters apart. I slit her mouth on both sides and brought the mucous membrane forward, and that is what gave her the normal width of the mouth slit.

Dr. H. E. Kelsey.—I want to ask another question, if I may.

Did Dr. Silverman when he spoke of the intermaxillary ligatures mean ligatures from the lower to the upper teeth?

Dr. Silverman.—Yes.

Dr. Kelsey.—I don't understand how you could pass that instrument in the mouth and have that in place at the same time that you ligated these teeth unless you had a tooth out.

President Howard.—I understood he had his ligatures in place, but not ligated.

Dr. Silverman.—I had my ligatures in place. I will show it again.

The mouth is opened. We have already placed our wires on at three points: in the molar and premolar (?) region, upper and lower, on the opposite side, and in the incisor region. Then I made my incision, passing a blunt instrument on the inner surface of the coronoid process, engaging the inner surface of the neck of the condyle, pressing it backward and outward, using the tuberosity as a fulcrum. There is always room between the molar region and the inner surface of the ramus with the mouth shut to permit the instrument; you can sometimes almost get a small finger in. While I was holding this instrument, the assistant carried the jaw to position and wired it; I then withdrew the instrument, and the operation was complete.

President Howard.—How about the instrument still in there?

Dr. Silverman.—This instrument is in the buccal region. This is the buccal surface

Dr. Silverman.—In other words, instead of saying the maxillary tuberosity, let me say of the upper molars.

Dr. H. E. Kelsey.—I quite understand now, Doctor.

that I use the buccal portion of the maxillary bone as a fulcrum.

ABSTRACT OF CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

Control of Bleeding in Minor Surgical Operations. L. Winter and C. G. Darlington (New York). Jour. of Dent. Res., March, 1926, vi, 1.

This paper is based upon the results of 200 coagulation and bleeding tests, and the conclusions of the authors are as follows: The average coagulation time was 4:54 and the bleeding time 2:35. The range of normal variation is given as four to ten minutes for coagulation time and one to five minutes for bleeding time, a variation of a few minutes having, therefore, no significance. As far as the authors can learn, in no case within normal limits does postoperative hemorrhage take place, but they advise determining these times in routine oral surgery, just as is advised for tonsillectomy in general. Naturally the introduction of suprarenin into practice tends to antagonize postoperative bleeding. While true hemophilia, which is transmitted along the male line, makes the typical bleeder, the same kind of hemorrhage occasionally occurs in other subjects.

If bleeding or coagulation time is prolonged in a test, calcium chloride or sodium citrate should be given for several days before operation in divided doses; but if the subject is a known bleeder and an operation is absolutely necessary 20 c.c. of horse serum or diphtheria antitoxin should be injected beneath the skin of the back twenty-four hours before operation. If hemorrhagic diathesis is due to some blood disease the latter must of course receive treatment. In oral surgery pressure is of value to check primary hemorrhage, and alveolar bleeding may be arrested by packing with iodoform gauze. In intermediate and late postoperative hemorrhage we should resort to heroic measures. The alveoli should have pressure applied through a saddle of modelling compound and a Barton bandage, while novocaine-suprarenin should be injected into the jaw and the gauze for packing should include an initial pledget of suprarenin solution before the iodoform gauze is inserted. In free oozing from the mucosa hot hydrogen peroxide should be used as an irrigation.

Varieties of Configuration in the Lips. H. Meige (Paris). La Rev. Stomatol., April, 1926, xxviii, 4.

The author, distinguished as an art anatomist and neurologist, has spent much time in the effort to characterize special types of lip contour. The subject is a vast one, and in the present article he limits himself to two peculiari-

ties of the upper lip which show much individual variation. These are the philtrum and the median tubercle. The former is the depression in the center of the fleshy portion and relieves the monotony of the surface of this lip. Its absence is said to give the face a look of brutality. Its shape is that of an inverted interrogation point. Above, beneath the septum of the nostrils, it is a groove which widens below into a fossa. A narrow horizontal ridge between the latter and the vermilion border of the lip is known as the crest of the philtrum. Study of portraits of historical characters shows considerable variation, in width, in depth or in the elevation of the margins, in height—variations which might have value in identification, in paternity, etc. It is present in the infant and is said to narrow in old age, largely perhaps from loss of the front teeth. Situated just below the philtrum and occupying the center of the red border, is the median tubercle, a slight prominence which stands in some relation to the philtrum. As a rule a broad philtrum would mean a wide tubercle but the tubercle may show peculiarities which are not associated with the type of philtrum. Thus a low-placed and at the same time voluminous tubercle gives the upper lip a snout-like character, the so-called tapir lip. The dentist should of all men have the best opportunity for the study of lip contours and of any kind of significance which they may possess. Apparently these are in no wise influenced by dental pecularities, or at least Meige does not mention any such possibility.

Cause of Alveolar Pyorrhea. K. Elander (Göteborg). Correspond. f. Zahn., May, 1926, 1, No. 5.

Despite the rôle of other causal factors the author is forced to the belief that the endameba is the efficient cause of pyorrhea to this extent: it has not been shown to be innocent in this respect. He admits equally that it has not been proved guilty either. The dentist and even the bacteriologist is not the one to decide upon this important subject. We have a special type of worker, the protozoologist, and the ameba is a protozoon. Let us therefore see some cooperation between these workers and the leading odontologic experts in pathology. There is hardly another microorganism which can be accused in this connection and the only alternative is the Vincent symbiosis —Bacillus fusiformis and Spirochete dentium. These when virulent can induce certain types of severe buccal disease of which the most severe is noma, but we see no connection between the pathogenicity of Vincent's organisms and pyorrhea. The ameba hypothesis goes back only to 1914 but is already long extinct, unwarrantably in the author's opinion. We have learned much about this organism—its hostility to bacteria, which it devours like a leucocyte, and thus it might be regarded as a sort of friendly bacteriophage, were it not for the fact that it also attacks the defensive leucocyte and devours its nucleus. It is of course found in the tissues without any pathogenic activity, but so is nearly every virulent germ at some time or other. Even the fact that cultures of ameba have never been made to produce pyorrhea cannot be regarded as conclusive, for this means only that some other factor or factors must cooperate, which has never been denied. We know that the ameba of dysentery, a kindred organism, can cause extensive

suppuration, as in abscess of the liver. The lining of the gum pockets is so specialized a formation that it may serve for a culture bed for this organism, notably the floor which is quite unlike the rest of the cavity, having no epithelial protection.

Oral Focal Infection as a Cause of Systemic Disease. E. C. Rosenow (Mayo Foundation). Med. Jour. and Rec., May 19, 1926, cxxiii, 10.

In the stomatologic number of the *Journal and Record* of above date Dr. Rosenow brings his views of this subject up to date. He alludes to his early labors in this field with Billings and his call to the Mayo Foundation to continue his research. His special technic in animal experiment has been widely followed out, and as a rule with corroboration, although some investigators have been unable to duplicate the findings. The author rests his case almost exclusively upon animal experimentation, which furnishes a ready demonstration of the specific localizing affinities of certain organisms in animal tissues. We are still in the dark as to the reasons for elective localization. The author seems to have taken no backward step in his teachings on these subjects but is not permanently committed to wholesale and ruthless extraction of teeth. A method should be found which will make it possible to sterilize infected teeth in situ, but he does not believe that such a method has yet been introduced—at least one of general applicability. He would at present extract infected teeth, either dead ones or those which will have to be devitalized, even without a roentgenogram and without clinical evidence of infection. Something might be done with vaccination in these cases, but any immunity which results is apt to be short-lived. He makes no allusion to the claims of certain dentists that they can sterilize teeth and cure focal infection without extraction. In addition to the cure of focal infection by extraction there is more or less incidental prophylaxis gained, for when such patients are followed up over long periods they will be found to have better general health than the average; that is a higher degree of resistance to miscellaneous diseases.

Oral Sepsis and Nephritis. Haas (Bielsko). Zahn. Rund., May 30, 1926, xxxv, 22.

During the European War it was noted that alveolar pyorrhea was very common, as was also the so-called war nephritis. Many medical men were inclined to believe that the kidney inflammation represented a focal infection from the diseased gums. The belief died out largely but is occasionally revived. The author as a physician attached to a temporary field hospital had a year's opportunity of watching these kidney cases in all degrees of severity. Albumin in the urine was sometimes abundant enough to solidify the urine on acidulating and boiling, and there were many cases of uremia, general dropsy, ascites and blindness along with relatively mild cases. As he was also a dentist, he examined the mouths of all soldiers, but not one case did he see with any essential alteration in the gums which could warrant the diagnosis of pyorrhea. There was some scurvy in the troops, but these sub-

jects were not interned in the hospital. There must of course be septic infection from the teeth as from any other locality, but it does no harm to infuse a few drops of mistrust into the foaming chalice of oral focal infection.

Fatal Hemorrhage Following Extraction of a Tooth. K. Zilkens (Berlin). Deutsch. zahn. Wchnschr., May 21, 1926, xxix, 10.

This death was originally reported by Dr. F. Kroh in the *Archiv für klinische Chirurgie*, cxxxvii, 389. It took place in a clinic at Cologne. The present author calls attention of the dentists to this very rare case which otherwise would pass unobserved. The patient was a boy aged twelve years who came to the surgical clinic with toothache and a swollen and tender left mandible. The affected tooth was the second molar, carious and loose. It was easily extracted but immediately a stream of blood the size of the little finger gushed from the socket. Digital compression was at once instituted and with the finger in the socket the bleeding was checked but compression of the blood vessels at the mandibular foramen was without effect as was also compression of the carotid. With an attendant's finger in the extraction wound the patient was anesthetized for the purpose of ligating the cervical vessels, but before this could be completed death took place. Autopsy showed a condition which Professor Kroh had already foretold—a cavernous angioma of the mandible which had developed in the smaller branches of the facial vein or pterygoid plexus. It might have been possible to foresee this complication had due attention been paid to the presence of these symptoms—a loose tooth, only a small amount of caries in the tooth, absence of any inflammatory element and history of recurrent hemorrhage, which was unchecked by carotid compression. While this lesion and this kind of death are excessively rare, it is possible that attention to this symptom group might prevent a similar happening in the future. Naturally with the correct diagnosis extraction would not be practiced until after ligation of the carotid.

Oral Sepsis. F. G. Riha (Innsbruck). Zahn. Rund., May 23, 1926, xxxv, 21.

The author gives a concise and exhaustive account of the doctrine of oral focal infection, beginning with the pioneer work of Wm. Hunter and passing rapidly to the independent movement in the United States which he reduces to a tabulation of the principal maladies which proceed from this cause. The documents in support of this doctrine are bacteriologic, clinical and roentgenologic. Next the author passes to the countermovement in the United States, although comparatively few take the conservative side among practitioners. He then mentions the reception of this doctrine in Germany and finally submits the evidence to a searching critic beginning with bacteriology. He finds a number of technicians who do not subscribe to the conclusions of Rosenow. Among the views which oppose him we find a disbelief in elective streptococcus affinity and the claim that it is the pneumococcus which is responsible for the mischief. The vast majority, even of those who reach opposite conclusions, admit that Rosenow is an unexcelled technician and pay heed to the statement of this scientist that his opponents

base their claims upon defective technic. In summing up Riha states his belief that animal experiment cannot run parallel with human clinical experience. According to Böhme forty years of bacteriologic experience show a steady drift away from conclusions based upon animal experiment. A practical question of great significance has to do with the frequency of oral focal infection and Riha is able to control but 21 cases which are beyond criticism. These few cases show a great range of pathogenicity including nephritis, retrobulbar neuritis and anemia with a preponderance of simple rheumatoid and neuritic cases. But three cases were of alveolar pyorrhea, the balance being apex granulomata.

Threatening Hemorrhages in the Buccal Cavity. M. Wassmund (Berlin). Zahn. Rund., May 16, xxxv, 20.

The author speaks first of the frequency of extensive and protracted bleeding in the mouth which is physiologic for women just before the menses, when the ovarian hormone is preparing blood. So great is the liability of hemorrhage that he has made it a rule not to operate at this time. It is known that adrenalin does not control this type of bleeding as well as others. The gums and buccal mucosa at this time are hyperemic. Generally speaking, hemorrhage from purely local factors is not dangerous; it is in general conditions like jaundice, chronic heart disease, nephritis, etc., that we may encounter danger. Hemorrhage may be of various kinds—from bone capillaries, from a single bone artery, from the alveolar artery, from the gums, etc. This variety makes necessary special means for hemostasis. The author describes and illustrates the various devices which go by his name for making pressure on the gums and jaws after the tampons have been applied. In regard to material he has for the past year made use of so-called stryphnon gauze with superior results; the degree of anemia produced is equal to that from adrenalin. It is, however, often necessary to employ general hemostatics, as in general conditions like jaundice. The first preference is for intramuscular injection of gelatine, given also as prophylactic along with some calcium salt (lactate) in the form of "comprets," while a third to be added is ordinary saline infusion as a substitute for transfusion. The heart may require stimulation by caffein, alcohol, camphor and oxygen inhalation.

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EDITORIALS

Is the Present Plan of Dental Education a Success?

We are wondering if a plan of dental education that makes it impossible for the dental department of the Vanderbilt University to continue, can be considered a success. When one considers that the purpose of professional education is to train men to serve the public, we cannot help but wonder how the public is going to be served, by making it impossible for schools like the Vanderbilt University to continue. A letter from Chancellor Kirkland states that the "Vanderbilt University announces with great regret the suspension for the present, of its school of dentistry. This step is made necessary by a combination of circumstances." In studying some of the conditions as outlined by Chancellor Kirkland in his letter we find the following statement: "Present requirements f r admission have greatly decreased attendance." This brings us face to face with the fact that during the last few years educational authorities have continued to increase the requirements for the study

of dentistry without any regard for conditions that may exist in certain localities. They have failed to realize that requirements which would not be a hardship on the students in one community might limit the number of available students in another. The decrease in the number of students would not be to the best interests of the public.

A few years ago the medical profession began to raise the requirements for admission to medical schools until at the present time, we find the number of medical graduates do not equal the number of practitioners leaving the profession from death or other causes. In other words, there are not enough physicians being graduated to keep up the ratio between the public and physicians. No provision is being made to serve the increase in population which is bound to come as a natural course of events. The action of the educational authorities in so controlling medical education as to eliminate certain medical schools and reduce the number of students has failed to benefit the public.

For every medical school that has been closed as a result of medical legislature there has arisen one or more schools giving instruction in various medical cults. We find the public has accepted these pseudophysicians with the same standing as the regular doctor of medicine. Consequently, we cannot see where the present plan of medical education has in any way benefited the public, as the first duty of the profession is to serve the public.

Any plan of education which will reduce the number of graduates from medical and dental schools to such a point that the public does not receive the proper service, and therefore is led to seek service elsewhere, cannot be considered a success. Any plan of education which will force a first-class dental school, such as Vanderbilt University, to close its doors needs investigating. The dental department of Vanderbilt University was established in 1879, and the graduates of that school have always occupied enviable positions in the dental profession. We very much question that the dental graduate under the present requirements for admission to dental schools, will be able to serve the public any better than the man who graduated under former requirements. Educational authorities should consider the locality in which the requirements are to be enforced. It is economically unfair to expect all dental students to seek education in the largely endowed universities. Not only is it unfair, but it is impossible, because we find that the large universities are limiting their classes and accepting only a small number of men who apply for admission.

We regret very much to learn that Vanderbilt University has been forced to close its dental department as a result of conditions imposed by the educational authorities. We fail to see where requirements which react in the above-mentioned manner can be considered as successful.

The American Illustrated Medical Dictionary*

The American Illustrated Medical Dictionary has been revised and enlarged. This book has long been the standard in the medical and dental profession. The new edition devotes more space to dental terms than previous editions. The reports of the Committee on Nomenclature of the Amer-

*The American Illustrated Medical Dictionary. By Dorland. Ed. 13, W. B. Saunders Company, Philadelphia and London, 1926.

ican Dental Association has been adopted and definitions taken from that Committee are so designated in the book.

Some of the old dental terms which have been copied evidently from different authorities should be revised by a dental editor. We notice the term *Premolar* is defined in four different ways: (1) situated in front of the molar teeth; (2) as bicuspid; (3) as preceding the molar tooth; (4) as deciduous molar tooth. A premolar cannot be all of those things. For example: a deciduous tooth and premolar are two different teeth. The definition of *Canine* could also be revised in keeping with the modern knowledge of dental anatomy.

The book is one which should be in the library of every dentist because of the complete manner in which various words are treated not only in regard to pronunciation but also in regard to derivation.

Pathology of the Mouth*

Dr. Frederick B. Moorehead of the University of Illinois, in conjunction with Dr. Kaethe W. Dewey, has given the profession a comprehensive and complete book upon the pathology of the mouth. In reviewing a book of this nature we are compelled to ask wherein the pathology of the mouth differs from that of other parts of the anatomy? Why a book of such limited size? We believe both the dental and medical profession will be better off when they realize that pathology of the mouth comes under the same head as any other abnormal condition. The book deals with a large number of pathologic disturbances which are treated in the works on general pathology.

In order to keep the book small, the authors have not given as complete a discussion of some of the diseases as they should. In fact, brevity, which is the "soul of wit," is not the best thing to find in books on pathology.

The first chapter of the book deals with *Anomalies of the Teeth.* In this chapter the writers refer to endocrine disturbances in so brief a manner as to give the student a very misleading idea in regard to the influence of the endocrine glands upon the development of the teeth and jaws. The authors enter the realm of orthodontia by discussing the anomalies of occlusion in which they refer to the "Hapsburg Royal Line" as being a striking example of the inheritance of malocclusion. They also give the Angle classification of malocclusion in which they emphasize the mesiodistal relation of the first permanent molars as being the basis of classification. The fallacy of the first molars as the key to occlusion has long been known to the orthodontic profession.

The book covers the field of pathology in a very complete manner, but many subjects are treated too briefly.

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*__Pathology of the Mouth.__ By Frederick B. Moorehead, D.D.S., M.D., and Kaethe W. Dewey, 1926, W. B. Saunders Company, Philadelphia.

ORTHODONTIC NEWS AND NOTES

The Odontographic Society of Chicago

Announces a testimonial dinner to be given in honor of C. Edmund Kells of New Orleans, La.

Dr. Kells is one of dentistry's most devoted disciples, and most active, versatile and beloved representatives. He is also the first American dentist to apply the roentgenogram to the practice of dentistry.

A special literary feature coincident with the dinner will embrace a symposium on "The Dental Hygienist," by Dr. Kells, as the guest of honor, Dr. Thomas J. Barrett of Worcester, Mass., and Dr. Alfred C. Fones of Bridgeport, Conn.

The problem of the dental hygienist is one of the most important issues confronting the dental profession today, and the essayists selected, together with Dr. Kells, are the most brilliant thinkers and writers on this subject at the present time.

The testimonial dinner is a deserving tribute to Dr. Kells, and the literary feature will be an educational treat to all present, and should aid much in solving this problem for the future.

Every ethical dentist throughout the United States and Canada is cordially invited to be present on this occasion.

The dinner and discussion will be held in the Grand Ball Room, Hotel LaSalle, Thursday evening, October 21, 1926, at 6:00 o'clock.

Remember the date and help to make this occasion a fitting honor to one of dentistry's most active and lovable characters by being present.—Dewitt C. Bacon, President; Hart J. Goslee, Program Committee.

University of Toronto

Faculty of Dentistry

Annual Dental Practitioners' Course

Sept. 13-18, 1926 (inclusive)

All ethical dental practitioners are most cordially invited to spend one week in the intensive study of modern procedures in various branches of dentistry. Fee for course, $25.00, payable to the Bursar, University of Toronto.

The course will be held the week following the Canadian National Exhibition.

Registration form will be sent upon application to the Dean.—Faculty of Dentistry, University of Toronto, Dental Building, Toronto 2.

Postgraduate Study in Orthodontics*

Dr. Mershon, at the invitation of the President (British Society of Orthodontics), gave some account of a postgraduate school which had been established in America for the teaching of orthodontics. This was at the University of Pennsylvania, and was a real postgraduate school in the true sense of the word. It was headed by Dr. Roy Johnson, who in America was acknowledged to be the greatest mind in the orthodontic world. He was a teacher and loved research, and was now doing the first really systematized research in orthodontics. He started last September, taking only a few students, and the course was to be for one college year. He had established also a staff of men of a caliber of which he thought no other institution in the world could boast. This was the only place the speaker knew of at present where men could go really to be educated as well as trained. He extended a warm invitation to members to attend the International Orthodontic Congress which was meeting in New York in August.

Notes of Interest

Dr. Henry Spenadel announces his location at 317 East 10th Street, New York, for the practice of orthodontia.

Dr. Bernard G. DeVries announces the removal of his offices June 1 to 823 Nicollet Avenue, Suite 705, Yeates Building, Minneapolis, Minn. Practice limited to orthodontia. Dr. Esther N. Farrand, associate.

Dr. Chester T. Sweet announces the removal of his office to 152 West 42nd Street, Knickerbocker Building, New York City, where he will continue to make Dr. V. H. Jackson's orthodontic appliances for the dental profession.

Dr. C. M. Musser, announces the opening of his office in the Professional Building, Fairmont, West Virginia. Practice limited to orthodontia.

Dr. William A. Murray announces the removal of his offices to 636 Church Street, Evanston, Illinois. Practice limited to orthodontia.

Dr. Edward R. Coleman announces to the dental and medical professions the opening of his office at 25 South Tenth Street, Allentown, Pennsylvania. Practice limited to orthodontia.

Dr. B. J. McGinnis announces the opening of his office at Suite 810-811 San Jacinto Bldg., Beaumont, Texas.

Dr. Carlton Burns Mott announces the removal of his office from 81 Patton Avenue to The Flat Iron Building, Asheville, North Carolina. Practice limited to orthodontia.

Dr. J. D. Odeneal announces the removal of his office to Suite 332-333 Lafayette Arcade Building, 436 W. Lafayette Street, Tampa, Fla. Practice limited to orthodontia.

Dr. William H. Elliott announces the removal of his offices to Suite 1225 David Whitney Building, Detroit, Mich.

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*From the May, 1926, issue of the Dental Record.